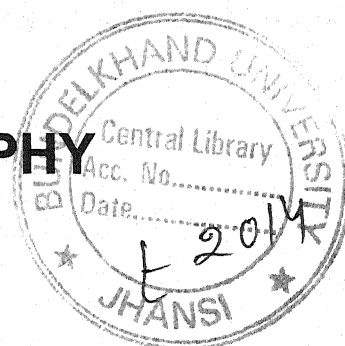


**SEROPREVALENCE OF HIV INFECTION AND STUDY
OF IMMUNE SYSTEM IN HIGH RISK AND LOW
RISK GROUP OF U.P. REGION.**

THESIS

**FOR
THE DEGREE OF
DOCTOR OF PHILOSOPHY
(ZOOLOGY)**



SUBMITTED

**TO THE FACULTY OF SCIENCE
BUNDELKHAND UNIVERSITY,
JHANSI (U.P.)**



**BUNDELKHAND UNIVERSITY,
JHANSI (U.P.) INDIA**

CERTIFICATE

The study, entitled "*Seroprevalence of HIV Infection and study of immune system in high risk and low risk group of U.P. region*" has been carried out under my constant supervision and guidance. The techniques employed in the study were undertaken by the candidate herself and the observations made therein were checked and verified by me from time to time.

She has put in necessary stay in the department as required by the regulations of bundelkhand University, Jhansi (U.P.).

The Thesis fulfils the basic ordinances, governing the submission of thesis for the degree of doctor of philosophy (Zoology), laid down by the Bundelkhand University, Jhansi (U.P.).

Place: Delhi

Date: January' 2007



(Dr. R.C. Sharma)
Asst. Professor & Head
Department of Biotechnology,
Delhi College of Engineering
Delhi.
(Supervisor)

Prof. R. C. SHARMA
HEAD
DEPARTMENT OF BIOTECHNOLOGY
DELHI COLLEGE OF ENGINEERING
BAWANA ROAD, DELHI-110042

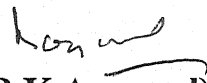
CERTIFICATE

The study, entitled "*Seroprevalence of HIV Infection and study of immune system in high risk and low risk group of U.P. region*" has been carried out by Km. Amita Kanaujia herself in this department of microbiology, Maharani Laxmi Bai Medical College, Jhansi.

She has put in necessary stay in the department as required by the regulations of bundelkhand University, Jhansi (U.P.).

Place: Delhi

Date: January' 2007


(Dr. R.K Agarwal)
M.D.

Professor & Head
Department of Microbiology,
M.L.B. Medical Collage &
Hospital, Jhansi (U.P.).
(CO-SUPERVISOR)

ACKNOWLEDGEMENTS

This dream of my life has become true with the kind blessings and untiring efforts of my well wishers and with an overwhelming sense of gratitude I wish to acknowledge to all those who made the completion of this work possible. I am unable to express my gratitude in words to those who by GOD grace, gave me a great moral courage in the completion of the present work.

I am sincerely indebted to my supervisor, Dr. R. C. Sharma, Asst. Proffessor and Head, Department of Biotechonology, Delhi college of engineering, Delhi. His kind supervision, invaluable suggestions and constant encouragement throughout, has led to the successful completion of this work. I shall forever be indebted to him for kindness and generosity. The joy and experience of working under his supervision is really something out of this world. His invaluable suggestions, meticulous attention and never to be matched expertise has been primarily, if not singularly, responsible for presentation of this work, in the present form.

It was my proud priviledge to have been associated with and remained under the constant vigilance of my Co- supervisor Proffessor R. K. Agarwal, M.D., Proffessor and Head, Department of Microbiology, M.L.B. Medical college and Hospital, Jhansi (U.P.). I owe deep and heartfelt thanks to him, for his patience in elucidating various aspects of the research work carried by me. This work has taken shape entirely due to his wise counsel, concrete and constructive suggestions, sincere criticism and meticulous attention.

I owe deep and heartfelt thanks to Dr. U.P. Singh, outgoing Principal, Bipin Bihari P.G. College, Jhansi for his encouragement and invaluable active help.

I acknowledge with deep sense of gratitude to Dr. M.C. Kanchan, M.Sc., Ph.D., Reader and Head, Department of microbiology and Principal, Bipin Bihari P.G. college, Jhansi, as his keen interest had made me to sail across ocean of this huge task. I also extend my sincere thanks to Dr. P.C. singhal, Reader, Department of chemistry, Bipin Bihari P.G., College Jhansi. He has been a constant source of guidance and encouragement in moment of my despair and it is virtually impossible to express in words, my deep sense of indebtedness and profound gratitude to him. My special thanks are due to Dr. V.I. Sharma and Dr. A.K. Srivastava , Reader Department of zoology, Bipin Bihari P.G. College Jhansi, for their kind co-operation and valuable suggestions.

I express all of my regards to my parents whose love, blessings, encouragement and moral support made me possible to reach this stage of life. My dearest daddy Shri. Hori Lal, retd. D.I.G. (Police), whose colleagues and references in police helped me a lot during the survey work of this thesis. Further it is my moral duty and rather, pleasure to express heartily gratitude to my younger brother Mr. Sachin who had contributed a lot, although indirectly, throughout my thesis work, to make it a success.

I shall remain ever thankful to commandant (P.A.C.), Shri. A.K. Singh D.I.G. (Police), Shri. N.B. Singh D.I.G. (Police), Shri. Vijay Singh D.I.G. (Police), S.S.P. (Police), District Judge, Jhansi, S.S.P. (Jail), Jhansi, Dr. M.C. Gupta, D. Orth., M.O. I/C District Jail Jhansi, whose sincere efforts and co-operation made me possible to complete this study.

My special thanks are due to my colleagues and friends Dr. Chandramani Singh, M.D., Dr. Sandeep Gupta, M.D., Dr. Hemant Kumar and Dr. Kishore Srivastava who, in spite of their busy schedule, helped me through various ways in the preparation of the present work.

I am thankful to all the staff members of the department of Microbiology, M.L.B. Medical college & Hospital Jhansi (U.P.), for their kind co-operation in the study. They provided me every facility, that I asked for.

I will remain indebted forever to all the study subjects who formed the material for this study. I also thank Veer Bundelkhand Press and Pawan computers who completed the thesis work nicely and in time.

Lastly, I offer my whole hearted thanks to all of them who, directly or indirectly, helped me and made it possible to perform the whole work in the present form.

Place : Jhansi (U.P.)

Dated : 12th January' 2007

Amita Kanaujia
(Amita Kanaujia)

LIST OF TABLES

HIGH RISK GROUPS

1. Study subjects by age and sex	114
2. Study subjects by marital status	115
3. Study subject by literacy status	117
4. Study subjects by religion and caste	118
5. Study subjects by social class	119
6. Responses on source of knowledge about HIV/AIDS	121
7. Knowledge on general aspects of HIV/AIDS among respondents	122
8. Knowledge on routes of transmission	125
9. Responses to the question : whether HIV/AIDS is a public health problem	126
10. Responses to the question : should investigation of HIV/AIDS be necessary before marriage?	127
11. Responses to the question : should every patient admitted in hospital be investigated for HIV?	128
12. Responses to the question : should every foreign tourist be investigated for HIV?	130
13. Responses to the question : should sex education be a lesson for school children	131
14. Responses to the question : should AIDS patient be separated from family?	132
15. Responses to the question : should a person touch and care an AIDS patient?	134
16. Responses to the question : should a person avoid sex with the attractive stranger?	135
17. Responses to the question : can AIDS patient work in factory/office?	136
18. Responses to the question: should a person divorce his/her spouse who has AIDS?	138
19. Responses to the question : should a person feel ashamed if he/she has AIDS?	139

20. Responses to the question : would you suggest a woman with AIDS for marriage and child bearing?	140
21. Study subjects by age at first sexual intercourse	142
22. (a) Study subjects who ever had sex with a partner other than spouse	143
22. (b) Study subjects who ever had sex with other partner by their number of sexual partners other than spouse	144
22. (c) study subjects of unmarried who had sexual relations	145
22. (d) Study subjects who are unmarried but have sexual relations by their numbers of sexual partners.	146
23. Study subjects by type of their sexual partners other than spouse	148
24. Respondents by practice of oral sex	149
25. Respondents by experience of anal sex	150
26. (a) Respondents by their spouse having any other sexual partner	152
26. (b) If yes, number of sexual partners their spouses had	153
27. Respondents by use of condom during sex	154
28. Respondents by need of injectables	155
29. Respondents by use of disposable needles and syringes	157
30. Respondents by transfusion of blood	158
31. Respondents by source of blood	159
32. (a) Respondents by donation of blood	160
32. (b) Respondents by donation of blood by number of times	161
32. (c) Respondents by serum of donation of blood	162
33. Respondents by use of intoxicated infection	164
34. Prevalence rate (%) of HIV amongst high risk group studied	165
35. Prevalence rate (%) of HIV amongst high risk group by age	166
36. Prevalence rate (%) of HIV amongst high risk group by marital status	167
37. Prevalence rate of HIV amongst high risk groups by literacy status	169
38. Prevalence rate (%) of HIV amongst high risk groups by religion	170
39. Prevalence rate (%) of HIV amongst high risk groups by caste	171
40. Prevalence rate (%) of HIV amongst high risk groups by social class	172
41. Prevalence rate (%) of HIV amongst high risk groups by use of condom	173
42. Prevalence rate (%) of HIV amongst high risk groups by sex	175

43. Prevalence rate (%) of HIV amongst high risk groups who are unmarried	176
44. Prevalence rate (%) of HIV amongst high risk groups by number of sex partners	177
45. Prevalence rate (%) of HIV amongst high risk groups by types of sexual partners	178
46. Prevalence rate (%) of HIV amongst high risk groups practicing oral sex	180
47. Prevalence rate (%) of HIV amongst high risk groups practicing anal sex	181
48. Prevalence rate (%) of HIV amongst high risk groups by blood transfusion	182
49. Prevalence rate (%) of HIV amongst high risk groups by donation of blood	183

LOW RISK GROUPS

50. Study subjects by age and sex	185
51. Study subjects by marital status	186
52. Study subjects by literacy status	187
53. Study subjects by religion and caste	188
54. Study subjects by social class	190
55. Resources on source of knowledge of HIV/AIDS	191
56. Knowledge on general aspects of HIV/AIDS	192
57. Knowledge on routes of transmission	194
58. Responses to the question : whether HIV/AIDS a public health problem?	195
59. Responses to the question : should investigation of HIV/AIDS be necessary before marriage?	197
60. Responses to the questions : should every patient admitted in hospital be investigated for HIV?	198
61. Responses to the questions: should every foreign tourist be investigated for HIV?	199
62. Responses to the question : should sex education be a lesson for school children?	200
63. Responses to the question : should AIDS patient be separated from family?	202

64. Responses to the question : should a person touch and care an AIDS patient?	203
65. Responses to the question : should a person avoid sex with the attractive stranger?	204
66. Responses to the question : can AIDS patient work in factory/office?	205
67. Responses to the question : should a person divorce his/her spouse who had AIDS?	207
68. Responses to the question : should a person feel ashamed if he/she has AIDS?	208
69. Responses to the question : would you suggest a woman with AIDS for marriage and child bearing?	209
70. Study subjects by age at first sexual intercourse	211
71. (a) Study subjects who ever had sex with partner other than spouse	212
71. (b) Study subjects who ever had sex with other partner by their number of sexual partners other than spouse	213
71. (c) Study subjects of unmarried who had sexual relations	214
71. (d) Study subjects of unmarried who had sexual relation by their numbers of sexual partners	215
72. Study subjects by type of their sexual partners other than spouse	217
73. Respondents by practice of oral sex	218
74. Respondents by experience of anal sex	219
75. (a) Respondents by their spouse having any other sexual partner	220
75. (b) If yes, number of sexual partners their spouse had	221
76. Respondents by use of condom during sex	223
77. Respondents by need of injectables	224
78. Respondents by use of disposable needles and syringes	225
79. (a) Respondents by transfusion of blood	226
79. (b) Respondents by source of blood	227
80. Respondents by donation of blood	228
81. Respondents by use of intoxicated injections	229
82. Prevalence rate (%) of HIV amongst low risk groups studied	230

LIST OF PLATES

ELISA PLATE	102
UNI-GOLD™ TEST	107
TRIDOT TEST	110

CONTENTS

INTRODUCTION	1
AIMS AND OBJECTIVES	6
REVIEW OF LITERATURE	8
MATERIAL AND METHODS	94
OBSERVATIONS	113
DISCUSSION	232
CONCLUSIONS AND RECOMMENDATIONS	252
REFERENCES	263
APPENDIX - A (SUMMARY)	i-x
APPENDIX - B (QUESTIONNAIRE OR WORKING PROFORMA)	I-III

INTRODUCTION

1. INTRODUCTION

AIDS, the-Acquired Immuno-Deficiency Syndrome, is one of the deadly sexually transmitted diseases that has piled enormous tension all over the world in recent times due to its divesting phenomenon. AIDS is caused by a retrovirus known as human Immuno-deficiency virus that spares individuals and damages the immune system. The damaged immune system cannot protect the body from the infection and persuaders. The individual enter this perish-den willingly via momental pleasure and became vulnerable to most of life threatening opportunistic infections, neurological disorders and unusual malignancies.

The disease, during the past, has frequently been misunderstood to be predominantly a homosexual disease. It is, infact, a sexually as well as asexually transmitted viral disease which first came into the attention of world through its appearance among five previously healthy and homosexual men in Los- Angeles (USA) and among heterosexuals in other countries.

Although AIDS was first recognized in USA in 1981, earlier cases were found by retrospective analysis to have occurred in 1978 in USA and in late 1970 in equatorial Africa. The present rate and patterns of HIV infection worldwide is setting the scene for the divesting spread of HIV infection. AIDS pandemic is present particularly throughout Asia – a continent in which over half of the world population live. The continued increase in HIV infection particularly in Southern and Central Africa and South Asia will accentuate the disproportionate impact of HIV /AIDS to developing world. HIV /AIDS continue to spread in South East Asia. The infection is not only increasing among individuals with high-risk behaviour but now starting to spread to general population as well.

The virus has been isolated in greater concentration in blood, semen and cerebrospinal fluid, and in lower concentrations in tears, saliva, breast

milk, colostrums and urine. The cervical and vaginal secretions are definite source of infection. Apart from it, it has also been isolated in brain tissue, lymph nodes, bone - marrow cells. Modes of transmission of these virus depend on exposure to body fluids from an infected person, quantity of virus as well as route of exposure and the duration of exposure. It is not known however how many viruses and over what period of time, are needed to cause infection or what other factors affect the chance of infection.

The AIDS and the entire spectrum of disease has become a problem of intense international interest. The causing virus is not transmitted through the air, casual contact, by insects, by food or water. Modes of transmission is by (a) sexual transmission (natural or unnatural) from person to person (same sex or either sex), (b) transmission of contaminated blood or blood products (c) sharing or reusing contaminated needles, razors or medical equipments and (d) during pregnancy, child birth, and possibly breast feeding from woman to child.

Serologic evidence of this infection is highly attributed to high risk, on one extreme of the spectrum, related to homo and hetero sexual habitants, multiple sexual partners, positive cases of STDs, intravenous drug users, beneficiary of regular blood transfusion, users of needles and syringes of a HIV patient, sex workers, child labours, nursing, and medical students and staff, to other extreme, the innocent fetus in a HIV positive mother's womb. Various studies conducted in India and abroad have observed high incidence of HIV in the aforesaid high-risk groups.

In India and other developing countries, sexual transmission of HIV is the dominant mode for the spread of AIDS. The most common route for the spread of HIV is by unprotected (without a condom) sexual intercourse between two partners when one partner is infected with the virus. Unprotected anal intercourse can also be a route of transmission. HIV has been found in sperms as well as in the seminal fluid. Artificial

insemination, where infected semen from a man is artificially inserted into a female, could also be a route of infection.

A single sexual encounter with all infected partner is sufficient to transmit HIV. However, some studies suggest that the risk from a single sexual intercourse between a male and female partner can be as low as one chance in one thousand. Although the risk from an individual sexual act may be low, the more the times a person has unprotected sex, the greater the chances of infection he has. Women appear to be more at risk than men from heterosexual sex. The most likely reason is that the infected semen from the man remains in the woman's body for a long period of time at a greater surface area and thus, increases the likelihood of infection. A woman with HIV will have the virus in her menstrual blood. Sexual intercourse during her period will be more risky. Her sanitary pads or tampons will also contain HIV.

The coming of AIDS has led to a greater willingness to talk about homosexuality in India. It is now generally accepted that homosexuality is more wide spread than had been believed. In addition, there are many homosexual men who perceive themselves as heterosexual, as they are married and have children. These male occasionally have sex with other male partners. HIV infection has been found only occasionally among homosexuals in India, although main mode of spread is still primarily heterosexual.

Female homosexuality or lesbianism, is considered a very low risk activity for transmission of HIV from masturbation. There is no risk of becoming infected with HIV by giving blood, provided the equipment used is sterile or once a - use disposable quality. However, receiving blood contaminated with HIV will lead to infection. Since late 1985, most western countries have been testing blood for HIV and this practice is increasingly being adopted in India. A World Bank report in 1991 estimated that only one

third of blood transfused in India was screened for HIV. Unfortunately in India, contaminated blood is still an important route of infection in the community.

This testing of blood does not remove all risk from transmission through donated blood. It takes 3 to 12 weeks after infection for the body to produce antibodies. If blood is donated during this window period, antibodies will not be detected by HIV test but the blood will still be infectious. Testing blood greatly reduces the risk of HIV infection, so this should happen rarely, but when there is high level of HIV in public there is still a risk. As such, it is important that blood transfusion should be given only when it is a dire necessity.

Another way by which contaminated blood can be passed from person to person is through intravenous drug injections. When people inject drugs such as heroin, they frequently draw in a small amount of blood into the needle. If another person uses the same needle, that blood containing the HIV virus will be injected and lead to infection. So most intravenous drug users from tight knit communities once injected with HIV, one person of the knit can spread it rapidly throughout whole community. By 1987, 50% of the population of drug users in the city of Edinburgh were infected with HIV (and only with substantial health education inputs the level of infection in 1992 very slightly declined).

There are variety of practices that involve piercing the skin with instruments which, if not sterilized, might lead to transmission of HIV. In India tattooing ear/nose piercing and circumcision are common skin piercing practices. Male circumcision and vaginal mutilation are practiced in many cultures which involve cutting off the foreskins of the organs. This is often done on babies but in many cultures it is carried out as a traditional ceremony when a group of boys/or girls are sexually instrumented together in groups. There are evidences, from some studies that circumcised male is

less likely to contact sexually transmitted diseases and HIV infection from sexual intercourse.

HIV can cross the placenta from the mother to the infant before birth. It is possible that HIV is also transmitted from the mother when the baby travels down the birth canal. The likelihood that a mother who is HIV antibody positive will give birth to an infected baby is between 30% to 35%.

HIV has been found in breast milk but this does not necessarily mean that it will always be passed on and infect the baby. There have been several studies which now indicate the transmission of HIV through breast milk in some cases.

HIV has been detected in saliva (and most other body fluids). This has raised worries about the possibility of contracting HIV through kissing or sharing utensils. The concentration of the virus in saliva is very low and there are substances in saliva that probably inactivate HIV. However, even if the virus is swallowed the acid in the stomach would most likely inactivate HIV. So there is almost no risk even in deep kissing. Infection through deep kissing might take place need of HIV/AIDS studies in low risk groups in INDIA.

1.1 NEED OF HIV/AIDS STUDIES IN HIGH RISK GROUPS IN INDIA

High-risk groups included in this study are truck drivers, prostitutes, Jail- inmates, police and P.A.C personnel. As sexual transmission is the most common mode of transmission of HIV /AIDS, the high risk groups included in this study are more likely to indulge in unsafe sexual practices, due to the long stay outside their homes and families, thus, being at higher risk of infection of HIV. Sexually transmitted diseases increased chance of HIV infection (Lalit and Nath, 1993), jail -inmates are also at increase risk of homosexual relationship among themselves.

1.2 NEED OF HIV/AIDS STUDIES IN LOW RISK GROUPS IN INDIA

Low risk groups included in this study are students, teachers and paramedical staff. As contaminated blood and needles are also responsible for the transmission of HIV/AIDS, the low risk groups included in this study are likely to get infection through contaminated needles of syringes and contaminated blood transfusion.

For effective control and prevention of HIV/AIDS, it is essential to know the extent of problem in different groups of population. To know this, there have been very few studies in this part of the world. So there is urgent need for such type of studies in India. For prevention- of AIDS, it is necessary to know the knowledge of people on different aspects of AIDS and their attitude towards AIDS patients and high risk practices which are responsible for transmission of HIV /AIDS. Keeping these factors in mind, this study was designed to fulfil the gap in knowledge on HIV /AIDS in India

1.3 AIMS & OBJECTIVES

The present investigation was undertaken with following general and specific objectives:

- (1) **General objective :** To study the prevalence of HIV/AIDS in high risk groups viz prostitutes, truck drivers, Jail-inmates, police and PAC personnel of district Jhansi, Lalitpur and Orai in Uttar Pradesh as well as in low risk groups viz-students, teachers and paramedical staff.
- (2) **Specific objectives :** These were following:
 - (i) To explore the route of transmission in them.

- (ii) To see the type of opportunistic infection in AIDS patients.
 - (iii) To study the socio-economic and demographic correlates of HIV/AIDS.
 - (iv) To assess their knowledge, attitude and practises regarding HIV/AIDS.
 - (v) To remove the misconception regarding AIDS transmission via. Casual contact, sharing utensils, sneezing/coughing and mosquito bite etc.
 - (vi) To study the CD_4^+ cell count level of HIV positive cases if possible.
 - (vii) To promote awareness among the masses
 - (viii) To bring forth recommendations for use by health administrators and policy makers to control the malady and prevent HIV in the region from its further spread.
-

REVIEW OF LITERATURE

2. REVIEW OF LITERATURE

Acquired Immuno-Deficiency Syndrome (AIDS) is the end-stage infection with Human Immuno-Deficiency Virus (HIV), characterized by a cluster of life threatening illnesses. HIV infected people suffer intermittent bouts of illnesses that increase in severity as immune system collapse.

The acquired immuno-deficiency syndrome (AIDS) was first recognized in 1981 and since became a major world wide epidemic. AIDS is caused by HIV virus. By leading to the destruction and /or functional impairment of cells of the immune system, notably CD_4^+ T cells, HIV progressively destroys the body's ability to fight infections and certain cancers.

2.1 HISTORY OF HIV / AIDS

History of AIDS began in 1981 when two young men from New York visited their Doctors with symptoms of rare tumour Kaposi's Sarcoma. Similar diagnosis had been made in young men in other U.S. cities and cases of other rare disease Pneumocystis Carini Pneumonia had been, making its appearance in various parts of the country.

Both the patients were homosexual and their diseases indicated a drastically weekend immune system. That is why the syndrome was called as Gay Related Immuno-Deficiency Syndrome (GRID) for a short time in U.S.A.

The syndrome began to show its presence among with haemophiliacs, STDs, who received blood transfusion. The disease showed its appearance in Africa, Australia and Europe. Professor Howard Temin and Professor David Baltimore of U.S.A. then laid the first cornerstone for the discovery of HIV with detection of crucial enzyme reverse transcriptase. Primarily, after detection in 1981, HIV was termed as lymphodenopathy associated

virus (LAV) and thereafter some times, it was designated as Human-T Lymphocyte Virus or HTLV-III (WHO, 1994)

In the mean time, Doctors began to recall having seen syndrome of this kind in the late 1950's William *et al* (1983) reported a case of cytomegalic inclusion disease and *Pneumocystis carini* pneumonia seen by them in 1959. The other symptoms of patients were similar to present day AIDS.

Nahimas *et al* (1986) decided to test plasma of 1,213 patients obtained originally for Immuno genetic studies from various parts of Africa, as back as 1959 and out of 1, 213 patients studied, only one was found positive for HIV.

Forland *et al* (1988) described three Norwegian cases of proven HIV infection with clinical onset from the late 1960's, a child and her parents. In all three cases, clinical manifestations and immunological findings were compatible with AIDS and also frozen serum samples from all three patients were found to be-HIV antibody positive by ELISA and Western Blot.

Corbett *et al* (1990) examined paraffin blocks of the tissues of patients, earlier reported by Williams *et al* (1983) and all of the specimen were found to be HIV positive. Based on this information, it can be said that AIDS could have started in 40's or earlier, however, it was identified firstly in 1981.

Pavri (1994), to explain the origin of HIV said that there were two types of hypotheses generally put forward. One is based on cross-species transmission from non-human primates such as from Simian Immunodeficiency Virus (SIV) and other possibility is that, the virus might have been pre existent in humans but with extremely low prevalence or virulence or both.

Analysis in 1998 of the plasma samples from 1959 was interpreted as suggesting that HIV-1 was introduced into human around the 1940's or the

early 1950's, which was earlier than that previously been suggested. Other scientists have suggested that it could have been longer, perhaps around 1000 years or more ago.

In January 2000, the results of a, new study presented at the 7th Conference on Retrovirus and Opportunistic Infections. The study was carried out by Dr. Bette Korber of the Los Alamos National Laboratory. The estimate of 1930 (Which did have a 20 years margin of error) is based on a complicated computer model of HIV's evolution.

2.2 ABOUT HIV VIRUS

The International Committee on Nomenclature of viruses named it the Human Immunodeficiency Virus" (HI V) and to date two types, HIV-1 and HIV -2 are identified.

(NACO : Special Training Reference Module)

2.3 HIV-I Infection

Horsburgh, Ou, Jason *et al.*, 1989 stated that, antibodies to HIV-1 appear one to three months following infection in most people (Simmonds *et al.*, 1988). Typically, several years of asymptomatic HIV infection are followed by the appearance of signs or symptoms related to conditions resulting from moderate levels of immunodeficiency.

Overall, WHO estimates indicate that about 1 in 300 adults between the ages of 15 and 49 are presently HIV-1 infected; which is to say that about 1 in 240 men and 1 in 400 women in this age group are infected worldwide (Chin, 1990a)

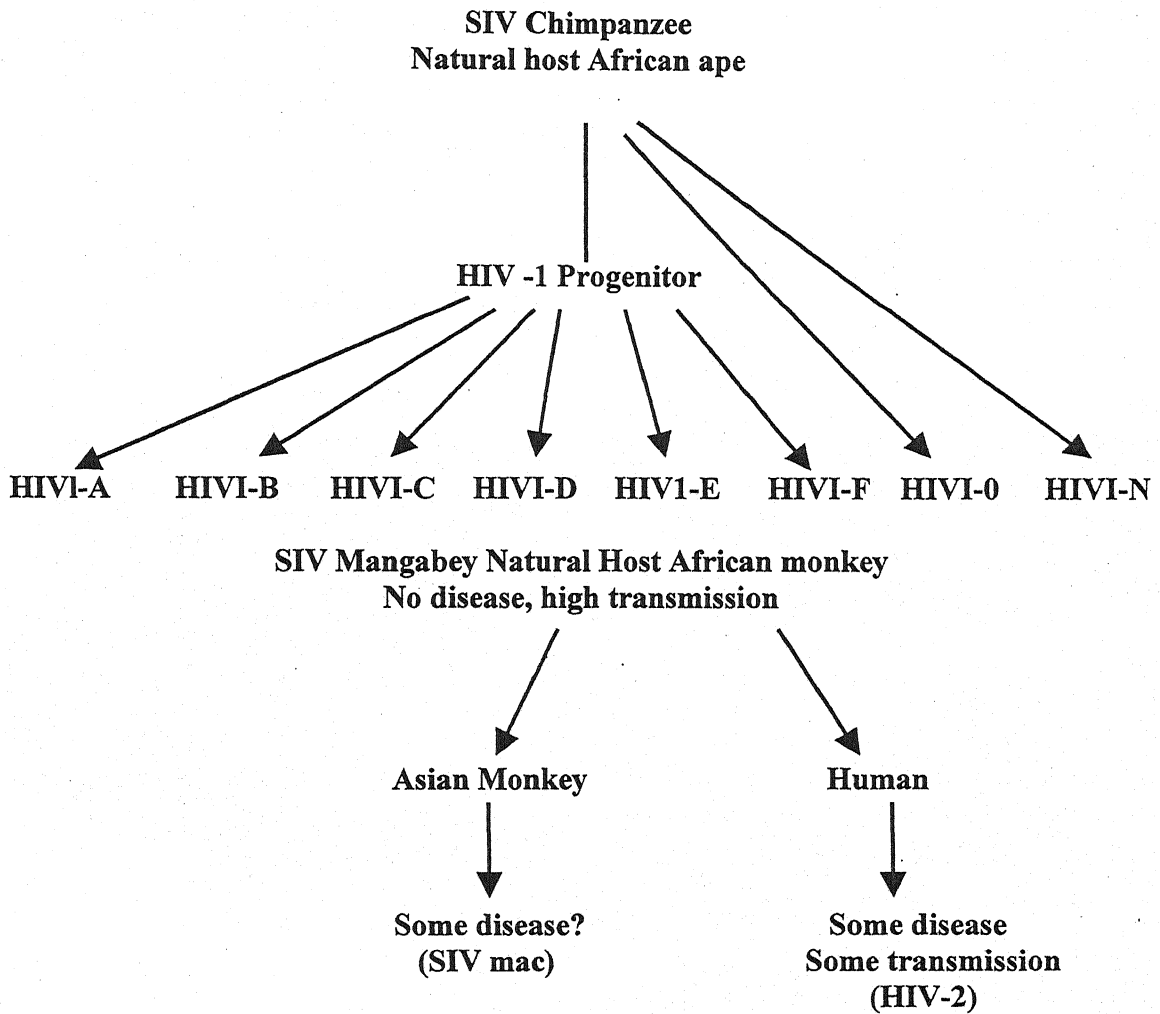
2.4 HIV-2 Infection

First isolated in 1986 from people with AIDS from West Africa, HIV-2 has been recovered from serum samples collected in the mid – 1960s in Coated' livewire, Gabon and Nigeria. While most cases of HIV-2 infection remain concentrated in West Africa, They have been reported throughout Africa (De Cock and Brun-Vezinet, 1989; Horsburgh and Holmberg, 1998).

Immunosuppression, decreased CD_4^+ lymphocytes, and AIDS may result from HIV-2 infection. However, preliminary information suggests that the incubation period may be longer, and that the perinatal transmission rate may be lower among HIV -2 infected people than among those infected with HIV-1. Prospective studies are in progress to better characterize HIV-1 disease progression and vertical transmission rates (Dc Cock and Brun-Vezinet, 1989).

The Human-T Lymphotropic retrovirus type (HTLV-1) was the first human retrovirus described and thus far has been associated primarily with adults T-cell leukemia, tropical spastic paraparesis and polymyositis (Gallo, 1991),

2.5 PROBABLE ORIGIN OF HIV



(Source:- NACO: Special Training Reference Module)

2.6 RETROVIRUS STRUCTURE

Retroviruses are enveloped ovoid particles of around 100-140 nm. An electron -dense core contains the capsid which surrounds a nucleocapsid complex composed of two identical molecules of genomic viral RNA (Gelderblorn, 1991) The genome of all replicating retroviruses consists of the three main genes: gag, pol, and env (Wills and Craven, 1991). Although structurally similar to other retroviruses, molecular analysis has shown HIV-1 to be of more complex genomic structure than other known retroviruses. In

addition to gag, env and pol, six other genes have been identified in the HIV-1 genome. These genes are tat, vif, vpr, vpu, rev and nef, encode proteins that regulate both viral expression and release.

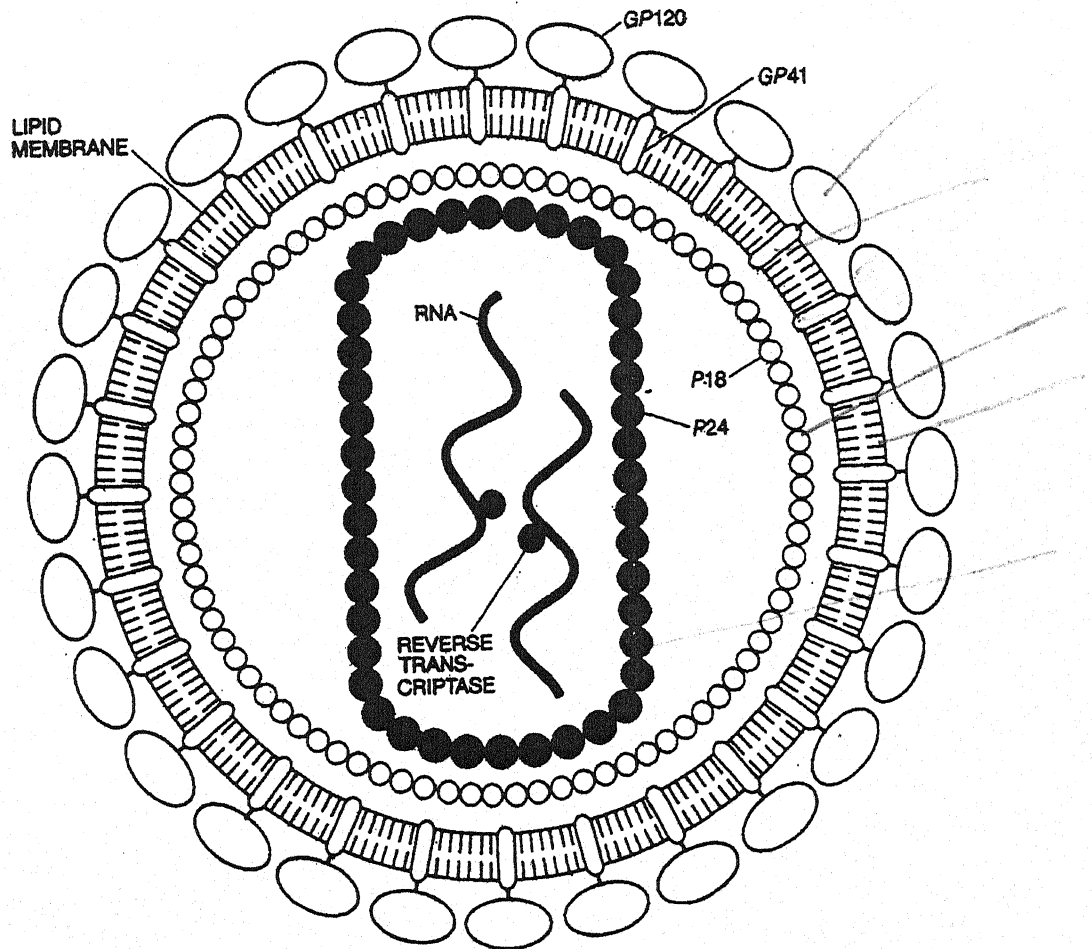


Figure 1 : Structure of HIV Virus particle

(Source : From Gallo, R.C. : The AIDS virus. Sci. Am: 256:46, 1987.)

Gag :- This gene codes for the core structural proteins. The order in which the three major gag products are linked in the precursor protein (P55) is invariable, MA-CA-NC. Retroviruses do not appear to need much of their NC sequence for partial production, but minor alterations of CA and MA can disrupt particles formation (Gelderblom, 1991; Wills and Craven, 1991).

Pol :- This gene encodes three enzymes which are essential for retroviral replication, reverse transcriptase (RT), integrase (IN) and protease (PR). (R.Madhok 1994).

Env :- This gene codes for the viral envelop proteins (the transmembrane protein gp41 and the major surface protein gp120 in HIV), gp 160 is the precursor of gp 120 and gp41. The envelope of HIV is studded with envelope-glycoprotein (knobs) which are oligomers of gp120. (R. Madhok 1994).

Tat :- The trans-activator of transcription (tat) is a 14-Kda protein encoded for by the tat gene. This protein, critical for viral replication, is thought to mediate its effect through its interaction with the trans-activation responsive region (TAR) of the HIV long terminal repeat (LAR). This interaction results in positive feedback since the tat gene itself is under LTR control.

Rev :- The rev gene product (formerly known as art, trs) is a 16-Kda protein and has been found primarily in the cell nucleus. This protein, required for HIV replication, is also a trans-activator. Viral structural proteins are regulated positively by rev.

Nef :- Encoded by the nef gene is a 27-Kda cytoplasmic protein. Recent results have suggested that nef may play an important role in infection *in vivo*, but is not essential for *in vitro* infections (Kestler, *et al.* 1991).

Vir :- The viral infectivity factor (vii), previously known as orf-A and

sor, is thought to affect the efficiency of viral replication.

Vpu :- This protein, formerly known as orf-U, is found in cells infected by HIV-1, but not HIV-2 (Cohen, *et al*, 1988) and is thought to be involved in the assembly of viral particles.

Vpr :- A 15-Kda protein is encoded by this gene. The protein has been shown to be another trans-activator of viral replication.

2.7 RETROVIRAL REPLICATION

Generally, HIV-1 infection is initiated by interaction of the viral envelope gp120 with the extracellular domain of the cell surface receptor CD₄⁺ (Dalglish, *et al*, 1984). Entry of the virus into the cell is mediated by the transmembrane protein (gp41) of the envelope protein (Stein, *et al*, 1987). Endocytosis is followed by cytoplasmic transport into multivesiculated endosomes (Gelderblom, 1991). The enzyme reverse transcriptase then converts the viral single stranded RNA into double - stranded DNA.

Integration of proviral DNA into the host chromosome requires the integrase protein (IN) (Grandgenett and Mumm, 1990). The IN proteins of HIV-1 were found to specifically cut two nucleotides off the ends of the linear viral DNA, and to integrate viral DNA into genomic DNA (Van Gent, *et al*, 1991). Once integrated, the virus usually remains latent until activated. Following activation, viral transcription occurs from the integrated proviral DNA by the type II RNA polymerase. Viral transcription is regulated by sequences in the long terminal repeats (LTR). The transcribed viral mRNAs can be classified as 'early' and 'late' (Cullen, 1991). The regulatory transcripts *tat*, *nef* and *rev*, which are multiply spliced, make up the 'early' class. The 'late' class is composed of viral mRNAs that encode for the viral upspliced structural proteins, *env*, *vif*, and the singly spliced *gag-pol* enzymatic proteins.

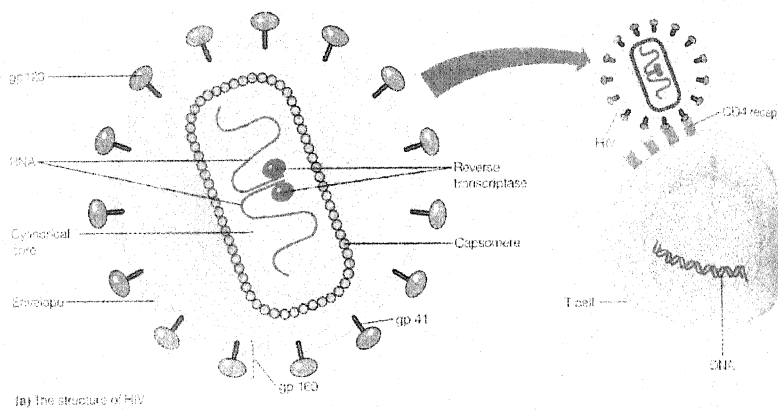


Figure 2 : HIV and its Infective ability

Source : Tortora, Funke, Case : 'Microbiology an Introduction' :
Fifth edition 1995. 480.

Post-transcriptional regulation results in a balanced pool of structural and regulatory mRNAs that is essential for a productive HIV-1 infection (Cullen, 1991; Rosen *et al*, 1990) this control point may prevent the progression of early viral replication to late replication in cells that are unable to support the increased levels of viral and protein synthesis (Cullen, 1991).

The resulting virion proteins are packed and assembled by the gag and gag-pol polyproteins (Wills and Craven, 1991). After the virion is released, viral proteases cleave the gag-pol protein thus releasing integrase and reverse transcriptase. Subsequently, these two essential enzymes are used for the synthesis and integration of new proviral DNA into host DNA. Prior to virion release, gag molecules condense to form an electron-dense core structure in the proximity of the nucleus. Mechanisms underlying transport to the plasma membrane and the gag induce viral budding are poorly understood. A small accessory protein unrelated to gag, vpu, is also involved in viral assembly. (Willis and Craven, 1991).

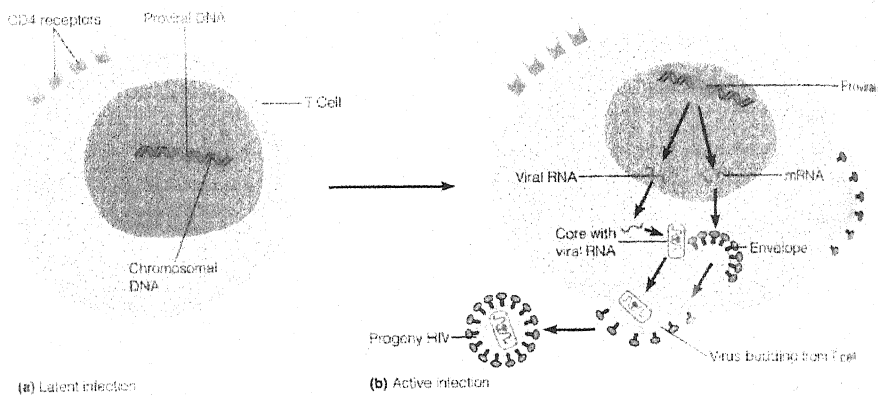


Figure 3 : Latent and active HIV Infection in CD_4^+ T cells.

Source : Tortora, Funke, Case : 'Microbiology an Introduction' :
Fifth edition 1995, 480.

2.8 HIV and immune system

The AIDS virus was indentified by using monoclonal anti bodies to show that a population of CD_4^+ cells was decimated by this infection. These helper T cells are vital to a vigorous immunes response. Helper T (T_H) cells play a central role in the immune response. Their major function is to stimulate other cells of the immune system to fight off intruders.

AIDS is actually only the end stage of an HIV infection. Shortly after initial infection, the person undergoes seroconversion-that is, tests positive for anti bodies to HIV. This interval is almost always less than six months. The serological profile of HIV infection shows five stages in the infection process (figure 4). Soon after infection, viral RNA is detectable in the serum. However, HIV infection is most commonly detected by the presence of anti-HIV antibodies after seroconversion, which normally occurs within a few months after infection. Clinical symptoms indicative of AIDS generally do not appear for at least 8 years after infection, but this interval is variable. The onset of clinical AIDS is usually signalled by a dicrease in T-cell numbers and an increase in viral load (Fauci.A. *et.al*, 1996). The Center for Disease Control and Prevention (CDC guidelines for AIDS diagnosis, 1993)

classification system divides the progress of HIV infection into five clinical stages.

STAGES-

Stage I – Acute (Primary infection) that is seroconversion.

Stage II - Early (asymptomatic Disease); CD_4^+ Count $> 500/mm^3$.

State III - Intermediate HIV infection stage; CD_4^+ Count is $200-500/mm^3$.

Stage IV- Late HIV Disease ; CD_4^+ Count $50-200 / mm^3$.

Stage V - Advanced HIV Disease ; CD_4^+ Count $< 50 / mm^3$

Stage I

a) Acute (Primary) Infection that is Seroconversion (Window period) with following symptoms-

- Initial infection with HIV is usually Asymptomatic.
- Incubation period (2-6 weeks), Longest upto 36 wks.
- About 50% sufferer and manifest Acute viral syndrome
- High fever
- Lymph Adenopathy
- Pharyngitis
- Arthrelgia
- Rashes (morilliform)
- Myalgia

(All above symptoms for the duration of about two weeks/ less and may even go uninvestigated as no one suspects HIV at this stage),

b) About 10-20% may present with –

- Meningo Encephalopathy
- Peripheral Neuropathy
- Myelopathy
- Bell's palsy

- G.B. (Guillen basic Syndrome)
- Oropharyngeal candidiasis.

During this CD_4^+ count drastically falls and recover in 2-4 weeks. Viral count rises and then falls. **HIV Antibody Test negative.** Diagnosis depends upon detection of viral antigen e.g. P_{24} Antigen via Polymerase chain Reaction test. This is the most dangerous period from point of view of transmission to others.

Stage II

Early (Asymptomatic) Disease (CD_4 cell count $>500/mm^3$) with following characteristics-

- Longest period of HIV Disease
- Patient remains healthy / asymptomatic
- Average duration 8-10 yrs (India 5-7 yrs)
- Period may be punctuated by various dermatological conditions
- G.B. Syndrome (Guillen basic syndrome)
- Peri-Neuropathy
- Polymyosites
- Persistent general lymph adenopathy (Node >1 Cm., and 73 months persistence)

CD_4^+ count declines at rate of 40-80 Cells/ mm^3 / year.

Stage III (Intermediate stage) and (CD_4^+ count 200-500 / cu mm) with following symptoms-

- Complication of HIV worsens/recur more frequently
- Person starts getting other disorders. Termed as ARC. (AIDS related complex)
- Recurrent Herpes Simplex.
- Oro-pharyngeal & vaginal candidiasis
- Oral hairy leukoplakia

- Mycobacterium T.B. Infection

- If left untreated – 30% - 50 % chance of developing AIDS & die within next 18-20 months.

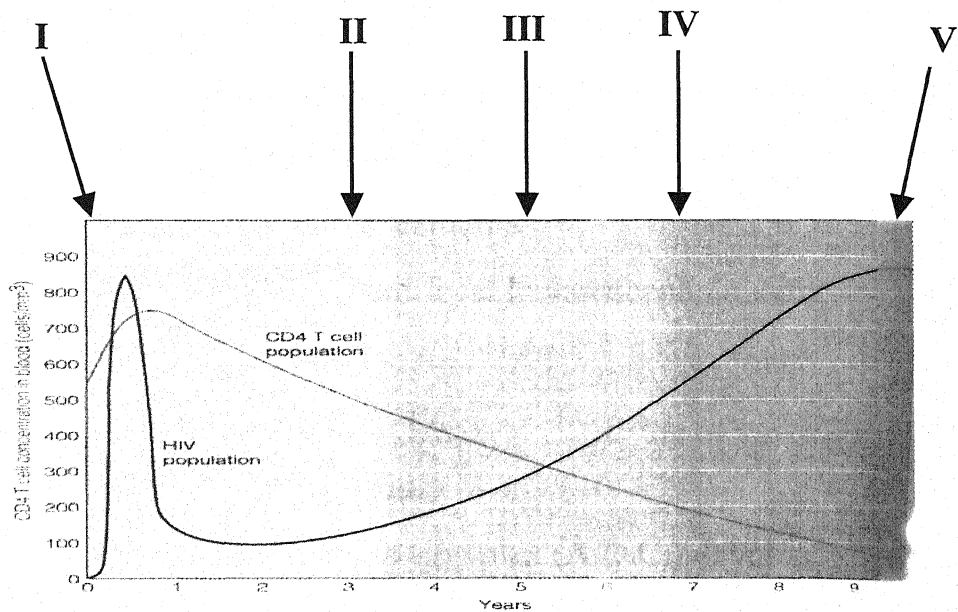


Figure 4 : The stages (I to V) of an HIV infection

Source : Tortora, Funke, Case : 'Microbiology an Introduction' :

Fifth edition 1995, 480.

Stage IV

AIDS, late HIV Infection stage (CD_4^+ count 50-200/mm³). Secondary opportunistic infections are as follows-

- *Pneumocystitis carinii* pneumonia
- Various Diarrhoeal disorders
- Multi-dermatomal H-Z- infection
- Cryptococcal meningitis
- Severe oro-pharyngeal candidiasis
- Pulmonary or disseminated T.B.
- Kaposi Sarcoma

Stage V

Advanced HIV infection (Advanced AIDS- CD_4^+ count $< 50/mm^3$) and death is likely within 2 yrs despite therapy. Spectrum of infection is with frequent relapses despite treatment and secondary prophylaxis is required. Common infection at this stage are –

- M.V.C. (Mycobacterium Avium Complex)
- Systemic histoplasmosis
- Cryptococcal meningitis
- Progressive Multifocal leukoencephalopathy
- CMV retinitis
- CMV colitis
- CMV encephalitis
- AIDS Dementia Complex (A.D.C.) develop
- Motor abnormalities
- Cognitive impairment
- Behavioural changes
- HIV wasting syndrome
- Weight Loss
- Wasting of muscles
- Various types of malabsorptions and features of Addison's disease.

2.9 CASE DEFINITION OF AIDS

Surveillance of HIV infection and AIDS is important for monitoring the course of the HIV pandemic and planning appropriate public health responses. For the surveillance of AIDS cases WHO recommends the systemic reporting of AIDS cases using an appropriate National AIDS Surveillance case definition for adolescents and adults. A meeting was

convened at Geneva by WHO/GPA to review and modify the current case definition recommended by WHO/GPA were WHO cases definition for AIDS surveillance and an expended WHO AIDS surveillance cases definition (Weekly Epidemiological Record, 1994).

2.10 W.H.O. CASE DEFINITION FOR AIDS SURVEILLANCE

For the purpose of AIDS surveillance, an adult or adolescent (>12 years of age) is considered to have AIDS if at least 2 of the following major signs are present in combination with at least 1 of the minor sign listed below, and if these signs are not known to be due to a condition unrelated to HIV infections.

MAJOR SIGNS

- Weight loss > 10% of body weight.
- Chronic diarrhoea for more than 1 month.
- Prolonged fever for more than 1 month (intermittent or constant)

MINOR SIGNS

- Persistent cough for more than 1 month
- Generalized pruritic dermatitis
- History of Herpes zoster
- Oropharyngeal candidiasis
- Chronic progressive or disseminated Herpes simplex infection
- Generalized lymphadenopathy

The presence of either generalized Kaposi's Sarcoma or Cryptococcal Meningitis is sufficient for the diagnosis of AIDS for surveillance purposes.

Advantage of the WHO cases definition for AIDs surveillance are that it is simple to use and inexpensive since it dose not relay on HIV

serological testing. Limitations of this case definition are its relatively low sensitivity and its low specificity particularly with respect to tuberculosis, since HIV-negative tuberculosis patients could be counted as AIDS cases because of their similarity in clinical presentation.

2.11 Expanded W.H.O. case definition for AIDS surveillance

For the purposes of AIDS surveillance an adult or adolescent (>12 years of age) is considered to have AIDS if a test for HIV antibody gives a positive result, and one or more of the following conditions are present:

- 10% body weight loss, with diarrhoea or fever, or both, intermittent or constant, for at least one month, not known to be due to a condition unrelated to HIV infection
- Cryptococcal meningitis
- Pulmonary or extra-pulmonary tuberculosis
- Kaposi's sarcoma
- Neurological impairment that is sufficient to prevent independent daily activities, not known to be due to a condition unrelated to HIV infection (for example, trauma or cerebral vascular accident)
- Candidiasis of the oesophagus (which may be presumptively diagnosed based on the presence of oral candidiasis accompanied by dysphagia)
- Clinically diagnosed life-threatening or recurrent episodes of pneumonia, with or without etiological confirmation
- Invasive cervical cancer

Major features of this expanded surveillance case definition are that it requires an HIV serological test, and includes a broader spectrum of clinical manifestations of HIV such as tuberculosis, neurological impairment, pneumonia, and invasive cervical cancer. The expanded definition is simple

to use and has a higher specificity than the WHO case definition for AIDS surveillance. A disadvantage is that it requires the availability of HIV serological testing for clinical diagnostic purposes, which may be logistically difficult and costly.

Other case definitions for AIDS surveillance, in current use, include the 1987 revision of the CDC/WHO case definition, the Pan American Health Organization ("Caracas") case definition; the 1993 European case definition and the CDC expanded Case definition for AIDS surveillance. But these case definitions are appropriate for using in countries with, intermediate to high levels of sophistication as regards their diagnostic capabilities.

2.12 Paediatric case definition

According to Ramchandran (1991), all infants born to seropositive women are seropositive at birth. But HIV antibodies disappear over the next 6-18 months in uninfected children. There is no test to detect or to diagnose HIV infection at birth. Diagnosis of paediatric infection is therefore difficult and is made on clinical presentation and virus detection.

Clinically HIV infected children, present with failure to thrive, poor weight, gain/actual weight loss, hepato-spleno-megaly, chronic fever and recurrent viral, bacterial and/or fungal infections of skin, G.I.T. and respiratory tract. CNS abnormalities occur in 50-80% of infected children.

2.13 WHO Clinical Case Definition for Children

Paediatric AIDS is suspected in an infant or child presenting with at least two major signs associated with at least two minor signs in the absence of known case of immuno-suppression.

Major Signs:

- a) Weight loss or abnormally slow growth (failure to thrive)
- b) Chronic diarrhoea for > 1 month
- c) Prolonged fever for > 1 month

Minor Signs :

- a) Generalized lymphadenopathy
- b) Oropharyngeal candidiasis
- c) Repeated common infections (otitis, pharyngitis and so forth)
- d) Persistent cough for > 1 month
- e) Generalized dermatitis
- f) Confirmed maternal HIV infection

2.14 AWARENESS OF AIDS/HIV

Agarwall *et al.* (1993) conducted a study in six high school in Ambala and found that condoms could prevent transmission was known to 44% of students.

Ashebir (1996) did a survey on 60 patients with STD's over one months and found that 43 patients (71.7%) knew the preventive methods of HIV/AIDS transmission and their practice was found only for condoms.

Bhattachalarya *et al.* (1994) in their study on Anganwari workers and labour observed that only 30% of Anganwaris and 10% labourers suggested use of condom of sex with unknown workers.

Bhende (1994) studied that 125 boys and 85 girls and found that according to 19 boys and 9 girls, AIDS was curable, whereas 25 boys and 14 girls said that AIDS is preventable. The method of prevention mentioned were: have only one sexual partner, avoid visiting prostitutes and use of condom (mentioned by only 6 boys).

Balaganesh *et al* (1994) Reported that only 24.6% of the respondents, who were aware of AIDS, knew that it was not a curable disease. Further, among the illiterate persons, were aware of AIDS, no one knew that condom was protective against AIDS, whereas among literates (aware of AIDS), only 19.4% knew about the safety offered by condoms.

Chitale *et al* (1992), 19% students in Bombay, 28% in New Bombay and 13% in Sholapur thought that AIDS was a curable disease.

Chandra *et al* (1993), observed that about 75% students thought that having only one sexual partner could prevent AIDS, whereas 76%, 77.5% and 71% thought that proper screening of blood donors, using condoms and avoiding sex with prostitutes, respectively could prevent AIDS.

Coulaud (1995) carried out a survey on adolescent between 15-19 years and found that they had good level of knowledge but persistence of sexual practice was associated with possibility of transmission.

Fogarty (1990) in his study on 2614 leaving certificate students observed that over 95% of respondents were aware of epidemiological proven means of transmission and between 73% and 98% understood that no transmission risk existed in a range of ordinary social contact situation. 51% of students believed that HIV transmission risk occurred in persons receiving blood transfusion.

Francis *et al* (1994) Showed that 36% of the respondents thought that AIDS could be cured if detected early. Further, 66% knew that the chances of getting AIDS decreased if one had sex with only one faithful partner and 70% students thought that use of condom could prevent AIDS.

Kathlee *et al.* (1996) observed that women's knowledge about condoms varied large proportionate of women believed that Vaseline, hand lotions or oils were good lubricants for condoms and one quarter believed that use of condom pained in man.

Mawar *et al.* (1993 to 1995) in his study on 400 sex workers and 302

other workers (FOW) found that 77% of FSW and 48% FOW knew condom to be protective. 60% of FSW used condoms to prevent pregnancy FSW reporting consistent condoms use in past three months were more likely to have used condoms a contraceptive or had tubal ligation.

Mittal M. *et al.* (1994-95) conducted a survey on 230 Jhuggi -Jhopris with a population of 1500 and found that the utility of condom in prevention of AIDS was known to 33% of females.

Mittal (1994) carried out his study on 230 Jhuggi - Jhopris with an approximate population or 1500 observed that 65.3% women did not know whether AIDS was curable or not. Sachdev (1998) conducted a survey on 88% students engaged in social work, nursing and humanities from two major universities of Delhi and observed that despite their awareness of personal risk only four in ten used condom sometimes during intercourse.

Norr *et al.* (1996) conducted a study on 56 urban women in Bostwana village and found that only 11 said they used condoms or would do so with a future partner.

National Family Health Survey (1996) showed that the majority of women who had heard of AIDS, correctly perceived that it was not a curable disease and there was no vaccine against it. In almost every state, "Safer sex" was mentioned most frequently as a mean to avoid AIDS. A large percentage of women also mentioned use of condom. Other measure such as checking blood, using sterilized needle and avoiding pregnancy when infected by AIDS, were mentioned by less than half of the females who had heard about AIDS.

Okojie *et al.* (1995) in his study on 340 randomly selected workers in Benin city in Nigeria observed that there was good knowledge of different routes of transmission except of erroneous belief of 36.8 and 31.9%, that it could be transmitted by sharing of utensils and causal kissing respectively.

Odujinrin and Qadegoke (1995) surveyed 260 heath workers from

randomly selected health care workers and found that only 54.6% and 51.5% identified homosexuals and 14 drug users as being at higher risk.

Okojia *et al.* (1995) did a survey on 340 randomly selected workers in Benin City and found that 142 (42.8%) would willingly use the condoms for safer sex.

Robert *et al.* (1994) conducted a survey from 1987-1992 on public of Wales and found that a majority of adults in Wales were aware of high risk of infection from sexual intercourse and sharing needles and coming in contact with blood of someone infected with HIV. Nevertheless, the proportion who have had sexual intercourse with someone with HIV carriers a high risk declined in 1992 but confusion still remained about the nature of HIV infection amongst a minority of respondents. More than one in ten of the adults in the most recent surveys were of the opinion that kissing or being near someone with HIV who was coughing, sneezing carried a high risk of infection.

Srivastava *et al* (1992) revealed that they had sex with spouse. Further, wearing condom every time while having sex, was perceived to be protective against AIDS by only 1.4% respondents.

Sehgal *et al* (1992) conducted a survey in two areas in Tamilnadu\namely Madras and Dindigul district and observed that 70.3% had the knowledge about use of condom. However 81% never practiced the use of condoms with CSWs, 11.2% personnel interviewed did not know about condom, 55.7% of CSWs mentioned that they had never suggested to their clients to use condom, 31.1% suggested every time and 7.21% sometimes and 78.7% never kept condom for the clients. 11 % had these sometimes and 10.3% told that they always kept condoms for their clients. 81.8% persons were of opinion regarding availability would be available at shops setting routine household provision articles but only 5.6% desired it to be made available at PHC/Hospital. 2.17% told that condom were available.

38.1 % told that these were available sometimes only and 40.2% informed that condoms could always be available.

Sachdev (1998) conducted a survey on 88% students engaged in social work, nursing and humanities from two major universities of Delhi and observed that despite their awareness of personal risk only four in ten used condom sometimes during intercourse.

Saini *et al.* (1992) surveyed 340 males and 160 females of 15-45 year of age and observed that 10% could name the causative agent. 70% thought kissing could transmit it and 20% thought that it could be contracted by sharing food, clothes with AIDS patient and 98% knew that it could be contracted through prostitutes.

Srivastava *et al.* (1992) in his study on 182 school teachers observed that 68.3% knew of sexual contact and 25.5% knew blood to be mode of transmission, 12.4% felt casual contact while 6.2% responded that AIDS was a mosquito borne, homosexual or heterosexual and anal intercourse was considered to be cause of AIDS by 43.4% followed by heterosexual vaginal (37.2%) and lesbian (12.4%).

Sehgal (1992) conducted a random stratified survey covering 1028 persons and observed that 67.9% persons knew about the mode of transmission of HIV/AIDS.

Thergaonkar *et al* (1991) about 19% sailors, as compared to 2.44% officer, felt that AIDS was curable, -whereas, about 77% respondents reported that AIDS was prevented. Regarding measure of prevention 64.5% gave main preventable measure as sex with single partner and 59.70% felt that use of condom would prevent infection.

Verma (1998) in his study among the college students of Bombay and Pune observed that only 40% of students gave precisely correct answer and 24% students were of the opinion that sharing toilets could lead to HIV/AIDS.

Velhal *et al* (1994) found that nearly 87% and 63% students knew that the spread of AIDS could be controlled by avoiding sexual intercourse with multiple partners and strangers and by promoting use of condom, respectively. Also, two very important preventive aspects *i.e.*, to create awareness in the population and to promote voluntary blood donations were known to only 24.7% and 5.1% of students respectively.

2.15 KNOWLEDGE OF CONDOM

Ashebir (1996) did a survey on 60 patients with STD's over one month and found that 43 patients (71.7%) knew the preventive methods of HIV/AIDS transmission and their practice was found only for condoms.

Asindii *et al.* (1991) in his study on 738 secondary school youths in Calabar observed that only 31% were that condoms provide protection.

Balaganesh *et al* (1993) in a survey on 200 adults of rural area, reported that among the illiterate persons who were aware about AIDS (14.2%), no one knew that the spread of AIDS could be prevented by using condoms, 2.2% respondents said that the condom did not prevent the spread of HIV infection, among 85.8% of the literates being aware of AIDS, only 19.4% knew about safety offered by condoms while 42.5% denied their value, 17.2% rural and 41.7% urban respondents used condom routinely for contraception.

Chuttani (1990) Surveyed rural population in Delhi and Haryana and found that only 50% men and 12% women were aware of AIDS and out of them 92% men and only 29% of women stated that sex with female sex workers should be avoided for prevention of AIDS and only one man mentioned condom usage.

Day, ward and Harris (1988) in a study of 91 prostitutes recruited from an STD clinic in London, reported that more than half (59 percent) of

the women reported consistent condom use with paying customers. Of the 71 women who reported vaginal intercourse with their boy friends, 6 percent said they used condoms consistently with these partners.

Norr *et al.* (1996) conducted a study on 56 urban women in Bostwana village and found that only 11 said they used condoms or would do so with a future partner.

2.16 ATTITUDE TOWARDS AIDS PATIENTS

Francis *et al* (1992) in his study on 716 students observed that 62% agreed to the statements that other students should be informed if one of the student in school had AIDS 38.4% retired to eat from a restaurant if a person working there had AIDS and 14% agreed to risk AIDS than miss a chance of having sex with an attractive stranger, 69.2% believed that a test for AIDS is a must for all persons coming on retiring from abroad.

Poddar *et al.* (1996) conducted a survey on 206 respondents and found that 26.7% would have mixed with AIDS patients and 62.6% would inform others.

Robert C (1981-1992) conducted a survey on the general population of Wales observed that whilst a greater proportion in 1992 than in 1987 held the view that people with HIV should be able to live normally in the community. Attitude appears to have hardened towards those perceived to be practising high-risk behaviour such as injecting drug uses and homosexuals. The data also suggest that attitude appear to be closely related to the levels of knowledge.

Okojie *et al.* (1995) carried out his study amongst 340 randomly selected workers in Benin city and found that attitude towards AIDS sufferer was poor and 156 (45.9%) actually thought they should be octracized.

Sehgal *et-al.-* (1986-92) surveyed 1020 persons of Manipur district and observed that 19.6% expressed that the family member of a

known AIDS/HIV patient should not be welcome at home and 74.8% expressed that they would frankly discuss it with their spouse if they acquired HIV infection. 35.5% believed that HIV infected case should be totally isolated from society otherwise they will spare Infection. 17.5% believed that HIV infection children should not be allowed to attend school as they could transmit the disease. Moderate and very satisfactory grade 27% belonged to medium grade and 22% had very poor level of acceptance about social impact of AIDS patients. Among girls students 53 %, 25.1 % and 19.1 % had assessments corresponding to above grade.

2.17 TRANSMISSION OF HIV

Curran *et al.* (1984) The first report of AIDS linked to blood transfusions appeared in 1982. Since then, study have demonstrated the efficiency & widespread occurrence of this mode of HIV transmission. More than 95% of people transfused with HIV contaminated blood or blood components become infected (Donegan, *et al.*, 1990a; Donegan, *et al.*: 1990b; Ward *et al.*; 1989).

Donegan *et al.*; (1990) There is no indication that efficiency of HIV transmission varies by age or gender of recipient or by clinical condition for which transfusions were received.

Drucker (1987) The role of the addict is very important in the AIDS epidemic in three ways: The addict's contact with heterosexuals; the addict's use of needles, syringes, and other drug paraphernalia: and the risk of vertical transmission to the unborn child

Killings (1992) observed that HIV transmission through blood and blood products has been virtually eliminated in industrialized countries through the routine screening of donated blood and heat treatment of factors VIII and IX. This problem is increasing in developing countries. Globally,

HIV transmission through blood transfusion accounts for 4-6% and sharing of needles is estimated to account for 5-10% of all HIV infections in adults.

According to the National AIDS Control Organization (2000), injecting drug - users and blood transfusion and blood products infusion are responsible for 6% and 4% cases of HIV/AIDS respectively.

Lalit and Nath (1993) Sexually transmitted disease increase chance of HIV infection killings (1992) observed that HIV transmission through blood and blood products has been virtually eliminated in industrialized countries through the routine screening of donated blood and heat treatment of factors VIII and IX. This problem is increasing in developing countries. Globally, HIV transmission through blood transfusion accounts for 4-6% and sharing the needles is estimated to accounts for 5-10% of all HIV infection in adults.

According to the national AIDS Control Organization (2000), Injecting drug -users and blood transfusion and blood products infusion are responsible for 6% and 4% cases of HIV/AIDS respectively.

2.18 Opinion on introduction of sex education in study curriculum :

Brooks Gunn and Paikoft (1992) found that an effective school based HIV/AIDS prevention and/or sex education programme indicated that such programmes might successfully change attitudes towards risk behaviours, delay onset of sexual intercourse, increase student's knowledge about AIDS and reduce fear and stigma attached to AIDS.

Kuhn et al (1994) conducted a survey on school community of an African area and found that the whole school community aimed awareness about AIDS using a variety of educational methods operating through a number of channels.

Kumar *et al* (1995) conducted a survey on 213 teachers of four primary and one secondary schools in East Delhi and found that most of the teachers stated that they could play an important role in educating students as well as community regarding AIDS/STDs, three fourth of them had never discussed AIDS/STDs with their students. Majority of teachers were in favour of starting class room based education of AIDS/STDs beginning from secondary classes onwards and more than half opined that class teachers could educate students better than doctors or parents.

Mukhopadhyay *et al* (1996) conducted a survey on two boys colleges, one girls college, one medical college and one technical college in Burdwan town and found that a large majority (94.4%) were in favour of introduction of sex education at the curriculum and 3.6% were against it. Majority wanted the introduction of sex education at secondary or higher secondary level (59.1%).

Weeks *et al.* conducted a survey on 15 high risk school districts (per test N-2392) were randomly assigned to one of the three conditions : Parent interactive classroom curricular (Parent interactive components), parent non interactive (class curricula only); control (basic AIDS education ordinarily provided by the school) and observed that both treatment conditions had a strong positive impact enhancing students knowledge, attitude, communication patterns and behavioural incentive. In the two treatment group (parents interactive and parent non-interactive). The program effects appeared to be the result of school based curriculum and of student self-determined interactions, behaviour than the presence and absence of planned parental involvement.

2.19 INFORMATION EDUCATION AND COMMUNICATION (IEC)

In view of combating pandemicity of HIV Infection, extensive

information, education and communication (IEC) programme has been undertaken by Govt. of India, State Govt. and different NGO's. In the absence of any effective treatment or a vaccine, IEC activities have assumed most significant role for prevention of HIV infection. Among IEC role of mass media particularly television cannot be overemphasized in developing countries where level of literacy is low and school dropouts are common however messages should not be too many and should be clear and finely tuned.

It is extremely important to get feedback from the public as to how much information on AIDS has percolated in the minds of people especially the neo-college students who could take a leadership role in implementing future strategies on prevention of HIV/AIDS.

Balaganesh *et al.* (1993) conducted a survey on ten villages in rural areas and observed that awareness about AIDS was disseminated by mass media esp. doordarshan. Apart from NGO's, it has been found that 31.3% rural and 34.9% urban respondents gained knowledge on AIDS either from news media (12.52%), doordarshan (20.6%), through neighbours and family members (16.87) Lions Club Mahila Yojna Chittor district AIDS committee (68%).

Chandra (1993) in his study on college students found that newspapers, magazines (75%) and television (84%) were the main sources of information.

Goyal *et al.* (1994) conducted a survey on 712 males and 288 females of a rural community and found that maximum (29.4%) of respondents claimed to have the knowledge from television and radio followed by Doctors (6.5%) and nurses (4.1%).

Mittal *et al.* (1995) in his study on 230 Jhuggi Jhopris with population of 1500 found that television and radio were the sole sources of information regarding AIDS in 58.3% and 41.7% respectively. A statistically significant

contribution of television for awareness about AIDS was observed compared to its role in spreading knowledge why STD's posters, roadside boarding and newspapers which did not contribute significantly.

Porter (1993) conducted a survey on 153 English speaking adult men and women and observed that newspapers and television were the most common sources of information about AIDS and were cited by 85% and 54% respondents respectively. Several respondents stated that they first heard about AIDS when news of the actor Rock Hudson's death was publicized in India less than 2% of respondents had heard about the disease at school or at religious institutions.

Sehgal *et al.* (1992) conducted a survey on 1020 persons including general population high risk behaviour I/V drug users, seropositive and observed that 61.7% got the knowledge from newspapers, 61.6% from friends, 41% from Radio, 32% from TV and only 30.7% from health personnel.

Tikoo *et al.* (1995) in his study on 3850 unmarried young men and women revealed that general level of knowledge about AIDS was high and was obtained from newspapers, magazines, television and friends.

2.20 PREVALENCE OF HIV/AIDS IN HIGH RISK GROUPS

2.20.1 Seroprevalence of HIV/AIDS in Commercial Sex Workers -

T Jacob John (2002) conducted a survey among 400 CSWs in Chennai, Madurai and Vellore, Tamil Nadu and reported number of HIV positives.

Khabbaz *et al.* (1990) found in a recent study of the prevalence of related viruses (HTLV-I/II- among female prostitutes and found rates to be highest among women who had injected drugs.

Darrow *et al.* (1988) in a recent study of prostitutes who did not use

drugs found a significant relationship between infection and the number of personal (i.e. non paying) heterosexual partners.

CDC, (1987) reported the rate of HIV infection to be highest among prostitutes who were drug user.

Darrow *et al.* (1989), in press reported the rate of HIV infection among female prostitutes varying greatly from site to site, ranging from zero to 47.5 percent.

Day, Ward, and Harris (1988), in a study of 91 prostitutes recruited from an STD clinic in London found that more than half (59 percent) of the women reported consistent condom use with paying customers.

Chiasson and Colleagues (1988) recruited 671 men from a New York City STD Clinic and found that 138 men reported no risk factors for AIDS except vaginal intercourse with postitutes. Of the 138 men, 2 (1.4 percent) were found to be infected. Among 222 respondents who reported no risk factor et al, 3 men (1.4 percent) were found to be seropositive.

Chiasson *et al.* 1989 collected data from 955 men recruited from another New York STD Clinic situated in an area in which the cumulative HIV incidence rate was high and drug use, including the use of Crack, was common of the 571 men with no indentifiable risk factors, 262 reported contacts with prostitutes, and 15 (15.7 percent) of the 262 men were antibody positive.

UN AIDS, India (2006) reported A study in surat found that HIV prevalence among sex workers had increased from 17% in 1992 to 43% in 2000.

Chakraborty A.K. (1994-1995) reported in A community based sample survey of STD/HIV infections carried out among 150 commercial sex workers (CSWs) of one red light area in Calcutta, Hati about 74.44% CSWs practiced oral sex, 82.67% had the practice of washing external genitalia with antiseptic solution after sexual intercourse, about 69.11% of

CSWs were aware of sexually transmitted diseases and 30.67% had knowledge about AIDS.

2.20.2 Seroprevalence of HIV/AIDS in S.T.D. patients :

C.M. Singh (2002) in his study of 65 S.T.D. patients found 1.54% of prevalence rate of HIV/AIDS.

Kamat and Banker (1993) conducted a serological survey for detection of antibody to HIV-1 among persons belonging to various high risk groups in Bombay from 1987 to 1989. Among these, 599 patients were of various sexually transmitted diseases. Thirty-nine patients (5.2%) were found to be HIV-1 antibody seropositive by the ELISA and western blot tests.

Solomon *et al.* (1994) conducted a sentinel surveillance of HIV-1 infection, in Tamilnadu from 1989 to 1993. The sentinel population monitored were attendees of STD clinics, blood donors and antenatal mothers. During the study period they observed that there was 10- fold rise of HIV seropositivity among STD patients (1% to 10%), 2- fold rise among antenatal attendees (0.37 to 0.76%), and 3- fold rise in blood donors (0.24 to 0.72%).

Pedhambkar *et al.* (2001) in their survey on 260 patients (210 males and 50 females) attending the STD clinic (J.J. Hospital) at Mumbai, observed that overall HIV prevalence in STD patients was 31.18%, with. 29.5% in males and 38% in females.

Arora *et al.* (2000) conducted a survey in Haryana and a total of 1,66,866 blood samples from different groups of individuals were screened for the presence of HIV antibodies, out of total 17,764 blood samples were of patients attending STD clinic, 116 (0.65%) patients were found positive for HIV infection.

Mathai *et al.* (1990) conducted a survey on patients attending STD clinic at Christian Medical College & Hospital, Vellore and observed that out of 2,215 patients 9(0.4%) were found positive for HIV antibody. Whereas Mehendale (1996) in their study on 5,321 patients of two STD clinics in Pune observed that overall prevalence of HIV-1 infection was 21.2%. The prevalence was higher in females. (32,2%) than in males (19.3%).

Seven hundred and seventy seven patients who reported for investigation and treatment of STD and those on surveillance test of STD, were subjected to competitive ELISA test by **Arora and Prasad (1992)**, of 777 patients only one patient found HIV positive.

Narayan *et al.* (1994) studied 100 patients of STD in which 22% cases were of chancroid, 19% cases of syphilis, fifteen percent cases of genital herpes, ten percent cases of balanoposthitis, eight percent cases of gonorrhoea, two percent cases of non specific urithritis and 1% cases of scabies. Among the 100 STD cases, 5% were positive for antibodies to HIV.

Rathore (1997) designed a record based retrospective study from 1990 to 1995 at Safdarjung Hospital, New Delhi and observed that HIV seropositivity showed an ascending pattern since 1991. The HIV positivity rate went up from 1.7 HIV positive per thousand STD cases in 1991 to 15 in 1994. This increase was approximately nine times over a period of three years. Another study conducted in same hospital by **Ray *et al* (1995)** on 1229 patients attending STD clinic, observed that 0.5% were found positive for HIV antibody.

2.20.3 Seroprevalence of HIV/AIDS Amongst Police and P.A.C. personnel: Despite best efforts of the investigator, only one study could be found which might reveal seroprevalence of HIV/AIDS amongst Police and P.A.C. personnel in, India. **C.M. Singh (2002)** surveyed 134 police & 166

P.A.C. personnel and he found zero prevalence rate of HIV/AIDS in them. A study namely HIV/AIDS related knowledge attitudes and practices among South African military recruits however, was found.

2.20.4 Seroprevalence of HIV /AIDS amongst Jail-mates: The seroprevalence of HIV/AIDS in Jail inmates ranged from 0.08 to 33.8 percent, **Sunder et al. (1995)** conducted a study on 1,007 undertrials and 107 permanently convicted prisoners of central prison Bangalore, and observed that 20 (1.98%) prisoners were positive for HIV. In similar study in Orissa jail, **Pal et al. (1999)** found that all the prisoners of Indian origin (300), housed in these jails tested negative for HIV infection. **C.M. Singh (2002)** in his study surveyed 203 prisoners of Jhansi Jail and found 0.49% prevalence rate of HIV/AIDS in them.

On the other hand 33.8% (26/77) of Jail-inmates from foreign countries (Thailand and Myanmar), serving short terms in Orissa jail were found positive for HIV infection. According to the available reports, the prevalence of HIV infection in different prisons were 25 percent in Sao Paulo, Brazil, **Ferreira et al. (1996)**, 0.6% in Maputo, Mazambique, **Vaz et al. (1995)**, 0.8% among the Vietnamese in southern California, **Gellert et al. (1994)**, 10.9% in south eastern France **Rotily et al. (1994)**, 6.9% in Qubec, Canada, **Hakins et al. (1994)**, 18.8% among women prisoners in New York, **Smithet et al. (1991)** and 2.4% in Atlanta, **Horsburg et al. (1990)**. **Arora et al. (2000)** in their study found that out of 1306 Jail-inmates of Haryana state only one was positive for HIV.

2.20.5 Seroprevalence of HIV/AIDS among truck drivers

Agarwal and Kumar (1996) **Chandra et al. (1993)** and **Bhasin et al. (1999)**, 50%, 85% and 97.61% respondents reported Sexual route as a mode of transmission for AIDS respectively.

Burkina faso, Meda *et al.* (1998) The prevalence of HIV was found higher in study among 236 long distance truck drivers in Burkina Faso, observed that 18.6% truck drivers were positive for HIV

C.M. Singh (2002) observed education upto graduate and above, where in truck drivers group (1.28%) Maximum respondents having multiple sexual partners were from truck Drivers (82.5%). He reported that 35% truck drivers had sex with CSWs. And the Prevalence rates of HIV amongst high risk groups are overall point prevalence rate of HIV, observed in the present study was 0.87%. It was highest among truck drivers (2.13%) followed by STD patients (1.54%) and Jail-inmates (0.49%). No participants was detected positive for HIV amongst police and P.A.C. personnel.

Josi and Prasad (1999) according to them amongst truck drivers in southern states of madras, HIV prevalence quadrupled from 1.5% in 1995 to 6.2% in just one year later.

Lacerda *et al.* (1999) in similar study on truck drivers in Brazil observed that most positive participants were married (70%).

Rao *et al.* (1994) Conducted a study on 100 truck drivers and found that 8% respondents, reponed that AIDS could be transmitted through blood. Whereas 56% and 51% respondents said that it could be transmitted by blood and through infected needles and syringes. respectively (**Velhal *et al.* 1994**)

Rao *et al.* (1994) conducted a survey of 100 truck drivers and found that 63% knew about sexual mode of transmission, in the study of **Velhal *et al.* (1994)**, 93.4% of respondents knew that AIDS was transmitted sexually. 68% of the respondents knew as sexual route of transmission in study of **Srivastava *et at.* (1992)**.

Singh *et al.* (1999) found highest HIV positivity in those truck drivers who were in the age groups of 26 to 35 years.

Singh et al. (1999) conducted a study on one thousand truck drivers, operating along the national highways and reported that 4.3% truck drivers were positive for HIV.

2.21 SOURCE OF KNOWLEDGE ON AIDS

- i) **Newspapers-** While assessing the knowledge about AIDS among naval personnel, **Thergaonkar et al. (1991)** observed that the main source of knowledge was mass media (newspapers & magazines). Newspaper was also a main source (61.7%) of knowledge in the study subjects of **Sehgal et al. (1992)**. **Lal et al. (1994)** conducted a survey on 329 students of Delhi and observed that news papers were the commonest source of information (67.4%). In their study on 230 jhuggi-jhopris with population of 1500, **Mittal et al. (1995)** however, observed that newspapers did not contribute to all for knowledge. C.M. Singh 2002 conducted a survey among 803 high risk respondents and reported that about 14.69% respondents got knowledge about HIV/AIDS through newspapers. He also reported majority of PAC personnel got information about HIV/AIDS through newspaper (51.81%)
- ii) **Television-** Now-a-days television is very effective mode of transmission of information of public interest **Sehgal et al. (1992)** conducted a survey on 1020 persons including general population, I/V drug users, seropositives and prostitutes and observed that 32% got the knowledge from television. A survey among sexually active rural women of Pune district, done by **Kunte et al. (1999)** showed that nearly 45% respondents got information on HIV/AIDS from television. **Mehra and Kumar (1994)** also observed that most women (71.7%) came to know about AIDS from television. Another study in rural area conducted by **Lal et al. (1999)** showed that overwhelming proportion of (91.8%) men and women mentioned their first source of

information was television. **C.M. Singh (2002)** in his study on 803 high risk groups reported that television (60.15%) was the main source of knowledge about HIV/AIDS.

- iii) **Books & Magazines-** **Vander et al. (2001)** in their study on three hundred and thirty-nine recruits from South African National Defence force, observed that most of them obtained their knowledge regarding HIV/AIDS from school (34.8%) and the printed media (17.70%). In the study conducted by **Lal et al. (1994)**, (41.6%) respondents got the information from magazines. **C.M. Singh (2002)** in his survey of 803 respondents of high risk groups found that least percentage of study subjects (10.59%) reported that books and magazines were main source of knowledge about HIV/AIDS.
- iv) **Friends-** **Sehgal et al. (1992)** conducted a survey on 1,020 persons including general population, I/V drug users and prostitutes and observed that 61.6% respondents got the knowledge from friends. While assessing the knowledge about AIDS among naval personnel, **Thergaonkar et al. (1991)** observed that the inter-personal communication was one of the main source of knowledge on HIV /AIDS. **Lal et al. (1994)** observed in their- study of 329 students that 30.4% of students got information of HIV/AID from friends. **C.M. Singh (2002)** in his survey of 803 respondents of high risk groups reported that 14.57% respondents got knowledge about HIV/AIDS from family members and friends.
- v) **Radio-** About 41% of respondents received information of HIV/AIDS by radio (**Sehgal et al. 1992**). **Lal et al. (1994)** studied 329 students of Delhi, and observed that (23.6%) respondents were aware about AIDS by the radio. While in other study conducted by **Mittal et al. (1995)** in Jhuggi-Jhopris area, it was observed that radio was the major source of information (41.7%) for these people. **Mehra and Kumar (1994)** also

observed that 31.7% women come to know about AIDS from radio.

2.22 RISK FACTOR

Age- Singh *et al.* (1999) found highest HIV positivity in those truck drivers who were in age group of 26 to 35 years. Mahandale *et al.* (1996) found highest HIV prevalence in patients of STD in age-group of 20-29 years. Eighty nine percent of reported cases were in the sexually active and economically productive age-group of 18-40 years with over 50% of all new infections taking place among the youths below 25 years (National AIDS control organization, 2000). C.M. Singh (2002) in his survey of 803 high risk groups respondents reported that positivity of HIV was higher (1.06%) in the age group of 25 to 54 years followed by below 25 years of age group (0.45%).

Sex - According to Mahandale (1998), 84.3% AIDS cases were male with 15.7% cases being females. By WHO (2000), in South East Asia Region, more men (80%) were reported to have AIDS than women. Some others studies conducted in different parts of world also revealed that prevalence of HIV infection was more in men than women. As against these, Mahandale *et al.* (1996), in their study observed that prevalence of HIV amongst women was more (32.3%) than men (19.3%).

Maritall Status - Human immunodeficiency virus infection rate was more in married person as reported by Rathore (1997) and Singh *et al.* (1999) in their studies. There are many other studies in support of this statement, like the study of Sunder *et al.* (1995) on prisoners showed that 61% of HIV infected prisoners were married. However, no association of HIV/AIDS with marital status was found by Mathai *et al.* (1990) in their study. Lacerda *et al.* (1997) in similar study on truck drivers in Brazil observed that most of positive participants were married (70%).

C.M. Singh (2002) in his study on 803 high risk group respondents reported that most of the study subjects who were tested positive for HIV were unmarried (2.04%) and 0.49% were married.

HIV infections, AIDS cases and deaths in men outnumber from those of women in every geographical region except. Sub-Saharan Africa. While HIV transmission among women is growing, men including adolescent boys continue to represent the majority of people living world wide with HIV or AIDS. In some settings, men were less likely to pay attention to their sexual health and safety than women. Men are more likely to use alcohol and other substances than women. This leads to unsafe sex and increases risk of HIV transmission. Further, men are more likely to inject drugs, risking infection from needles and syringes contaminated with HIV (**WHO, 2000**).

Literacy Status- **Singh et al. (1999)** in their study observed that seropositivity was highest among the illiterate. In similar study on jail-inmates, **Sunder et al. (1995)** reported that majority of the seropositives were illiterates (53%). Another study conducted by **Mahandale et al. (1996)** among individuals attending STD clinics in Pune, India, found that the prevalence of HIV infection was lower among those individuals who had some formal education and some previous knowledge of AIDS, particularly in women. **C.M. Singh (2002)** in his survey of 803 respondents of high risk group reported that prevalence rate was highest among illiterates (2.92%), followed by participants who were moderately literate (0.78%), While it was zero in well literate groups.

Socio-Economic Status – The social, economic and cultural situation that create vulnerability to HIV infection have not been adequately studied or explained. There is little information available about different socio-cultural groups in India in terms of their basic sexual and drug-taking behaviours and patterns of sexual networking that causes virus to spread through a population. **Mathai et al. (1990)** in their study on patients with

sexually transmitted disease in vellore observed that most of the HIV infected patients (57%), belonged to poor socio-economic background. C.M. Singh (2002) in his study of 803 respondents of high risk groups reported that all the positive cases were in lower class (0.99%) no participant was positive HIV amongst middle as well as upper social classes.

2.23 PREVALENCE OF HIV/AIDS IN LOW RISK GROUPS

Despite best efforts of the investigator, no such study could be found which could reveal seroprevalence of HIV/AIDS among students, teachers and paramedical staffs in India. Though studies namely HIV/AIDS related knowledge, attitudes, practices, beliefs, behaviours and awareness among college students of India college youth of East Delhi, learning certificate students, health care workers in Logos Nigunia and among medical students and practitioners was found.

2.24 HIV/AIDS Global Scenario

Global overview

Twenty years after the first clinical evidence of acquired immunodeficiency syndrome was reported, AIDS has become the most devastating disease humankind has ever faced. Since the epidemic began, more than 60 million people have been infected with the virus. HIV/AIDS is now the leading cause of death in sub-Saharan Africa. Worldwide, it is the fourth biggest killer.

At the end of 2001, an estimated 40 million people globally were living with HIV. In many parts of the developing world, the majority of new infections occurred in young adults, with young women especially vulnerable. About one-third of those currently living with HIV/AIDS are aged 15-24. Most of them do not know they carry the virus. Many

millions more know nothing or too little about HIV to protect themselves against it.

An Overview of the HIV/AIDS Epidemic, 2001

Since the first clinical evidence of AIDS was reported two decades ago, HIV/AIDS has spread to every corner of the world. Still rapidly growing, the epidemic is reversing development gains, robbing millions of their lives, widening the gap between rich and poor, and undermining social and economic security.

An estimated 40 million people are living with HIV. In 2001, about five million people around the world became infected.

HIV/AIDS is now the leading cause of death in sub-Saharan Africa. Worldwide, it is the fourth-biggest killer. In 2001 alone, AIDS claimed three million lives. About one-third of the people currently living with HIV/AIDS are aged 15-24.

Most of them do not know they carry the virus. Many millions more know nothing or too little about HIV to protect themselves against it.

Sub-Saharan Africa

Sub-Saharan Africa is by far the worst affected region in the world. The estimated 3.4 million new HIV infections in sub-Saharan Africa in 2001 mean that 28.1 million Africans now live with the virus. It is estimated that 2.3 million Africans died of AIDS in 2001.

In several southern African countries, at least one in five adults is HIV-positive. Recent antenatal clinic data show that several parts of southern Africa have now joined Botswana with prevalence rates among pregnant women exceeding 30%.

In West Africa, at least five countries (including populous Nigeria) are

experiencing serious epidemics, with adult HIV prevalence exceeding 5%.

On the eastern side of the continent, the downward arc in prevalence rates continues in Uganda-the first African country to have substantially reduced the effects of a major HIV/AIDS epidemic. HIV prevalence in pregnant women in urban areas has fallen for eight years in a row, from a high of 29.5% in 1992 to 11.25% in 2000.

Determined prevention efforts in Senegal continue to bear fruits, thanks to strong political support for its programmes. There is growing evidence that prevention efforts are bearing fruit elsewhere. One new study in Zambia shows urban men and women reporting less sexual activity, fewer multiple partners and more consistent use of condoms. This is in line with earlier indications that HIV prevalence is declining among urban residents in Zambia, especially among young women aged 15-24.

Countries across the region are expanding and upgrading their responses. But the high prevalence rates mean that even exceptional success on the prevention front will now only gradually reduce the human toll.

Eastern Europe and Central Asia

Eastern Europe-especially the Russian Federation-continues to experience the fastest-growing epidemic in the world, with the number of new HIV infections rising steeply. In 2001, there were an estimated 250 000 new infections in this region, bringing to 1 million the number of people living with HIV.

In the Russian Federation, the startling increase in HIV infections of recent years is continuing. The total number of HIV infections reported since the epidemic began came to more than 129 000 in June 2001-up from the 10 993 reported for the end of 1998.

At 1%, the adult HIV prevalence rate in Ukraine is the highest in the region. In Estonia, reported HIV infections have soared from 12 in 1999 to 1112 in the first nine months of 2001. Outbreaks of HIV-related injecting drug use are also being reported in several Central Asian republics, including Kazakhstan and, most recently, Kyrgyzstan, Tajikistan and Uzbekistan.

In the Russian Federation and other parts of the former Soviet Union, the vast majority of reported HIV infections are related to injecting drug use, which has become unusually widespread among young people, especially young men. Given the high odds of transmission through needle sharing, the fact that the young people are also sexually active, and the high levels of sexually transmitted infections in the wider population, a huge epidemic may be imminent.

In south-eastern Europe, rates of sexually transmitted infections and injecting drug use are also on the rise, although still at considerably lower levels than elsewhere in the region. Drug trafficking, along with the economic and psychological aftermath of recent conflicts, are increasing the likelihood that HIV epidemics will emerge in this region.

In Central Europe, there is currently little indication of a potential rise in HIV infections. The Polish Government has successfully curtailed the epidemic among injecting drug users and prevented it from gaining a foothold in the general population. Prevalence remains low in countries such as the Czech Republic, Hungary and Slovenia, where well-designed national HIV/AIDS programmes are in operation.

Asia and the Pacific

In Asia and the Pacific, 7.1 million people are now living with HIV/AIDS. An estimated 1 million people became infected in this region in 2001, while the epidemic claimed the lives of 435 000 people.

HIV prevalence currently exceeds 1% in Cambodia, Myanmar and Thailand. But the apparently low national prevalence rates in other countries in this region are dangerously deceptive. They hide localized epidemics in different areas, including some of the world's most populous countries.

There is a serious threat of major, generalized epidemics. Surveillance data on China's huge population are sketchy, but the country's health ministry estimates that about 600 000 Chinese were living with HIV/AIDS in 2000. Given the recently observed rises in reported HIV infections and infection rates in many sub-populations in several parts of the country, the total number of people living with HIV/AIDS in China could well have exceeded one million by late 2001.

Vast and populous India faces similar challenges. At the end of 2000, the national adult HIV prevalence rate was under 1%, yet this meant that an estimated 3.86 million Indians were living with HIV/AIDS-more than in any other country besides South Africa.

After more than a decade of negligible rates of HIV, Indonesia is now seeing infection rates increase rapidly among injecting drug users and sex workers, in some places, along with an exponential rise in infection among blood donors (an indication of HIV spread in the population at large).

Cambodia and Thailand have shown that prompt, large-scale prevention programmes can hold the epidemic at bay. In Cambodia, concerted efforts, driven by strong political leadership and public commitment, lowered HIV prevalence among pregnant women to 2.3% at the end of 2000-down by almost a third from 1997.

The Middle East and North Africa

In North Africa and the Middle East, infections are rising off a low

base. Across the region, some 440 000 people are living with HIV/AIDS.

The epidemic's advance is most marked in countries (such as Somalia and the Sudan) that are already experiencing complex emergencies. While HIV prevalence continues to be low in most countries in the region, increasing numbers of HIV infections are being detected in several countries, including the Islamic Republic of Iran, the Libyan Arab Jamahiriya and Pakistan.

High-income countries

The notion that the epidemic is a thing of the past in high-income countries is unfounded. An estimated 1.5 million people live with HIV in those regions, many of them productively, thanks to pervasive antiretroviral therapy. But that achievement is overshadowed by the fact that prevention efforts are stalling.

In the high-income countries, over 75 000 people acquired HIV in 2001. New evidence of rising HIV infection rates in North America, parts of Europe and Australia is emerging. Unsafe sex, reflected in outbreaks of sexually transmitted infections, and widespread injecting drug use are propelling these epidemics.

In high-income countries there is evidence that HIV is moving into poorer and more deprived communities, with women at particular risk of infection. Young adults belonging to ethnic minorities (including men who have sex with men) face considerably greater risks of infection than they did five years ago in the USA. African-Americans, for instance, make up only 12% of the population of the USA, but constituted 47% of AIDS cases reported there in 2000.

HIV prevalence rates among injecting drug users give special cause for alarm: 18% in Chicago and as high as 30% in parts of New

York. Portugal is among the countries facing a serious epidemic among injecting drug users. Of the 3733 new HIV infections reported there in 2000, more than half were caused by injecting drug use. By contrast, needle and syringe exchange schemes in Australia are still slowing the increase in prevalence among injecting drug users.

Reports of new HIV infections indicate that sex between men is an important transmission route in several countries, including Germany, Greece and the United Kingdom. In Japan, the number of HIV infections detected in men who have sex with men has risen sharply in recent years. There are also signs that the sexual behaviour of youth in Japan could be changing significantly and putting this group at greater risk of HIV infection.

Latin America and the Caribbean

More than 1.8 million people in this region are living with HIV/AIDS, including the 190 000 adults and children who became infected in 2001. Some 1.4 million people are living with HIV/AIDS in Latin America and 420 000 in the Caribbean.

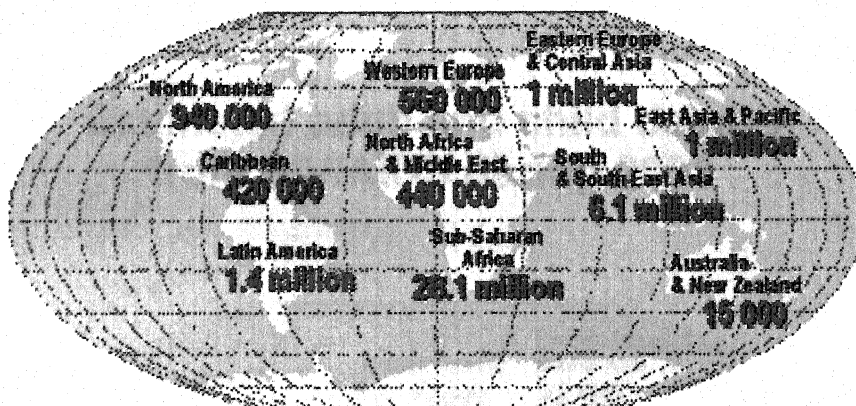
The Caribbean is the second-most affected region in the world. In several countries, HIV/AIDS has become a leading cause of death. Worst affected are Haiti (with the highest HIV adult prevalence rate in the world outside sub-Saharan Africa) and the Bahamas, where adult HIV prevalence rates are above 4%.

Along with Barbados and the Dominican Republic, several Central American and Caribbean countries had adult HIV prevalence rates of at least 1% at the end of 1999, including Belize, Guyana, Honduras, Panama and Suriname. By contrast, prevalence was lowest in Bolivia, Ecuador and other Andean countries.

Relatively low national HIV prevalence rates in several other

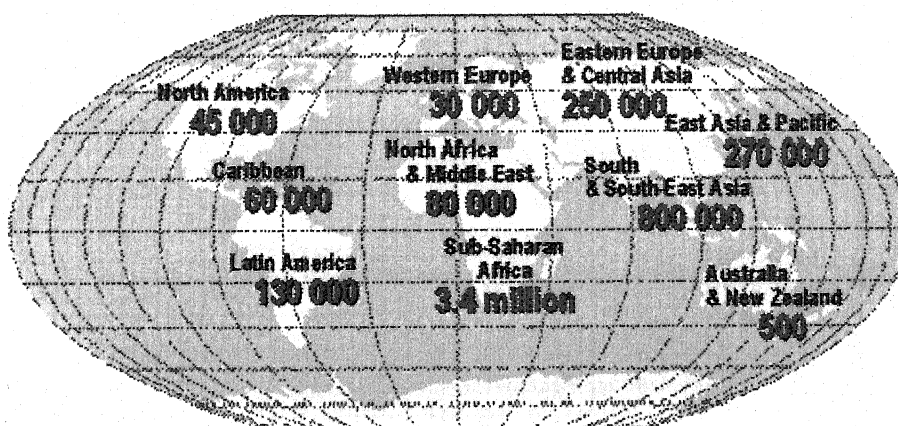
countries mask the fact that the epidemic is already firmly lodged among specific population groups. However, Brazil's determined efforts show that countries can avert more extensive epidemics by stepping up their responses.

Adults and children estimated to be living with HIV/AIDS as of end 2001



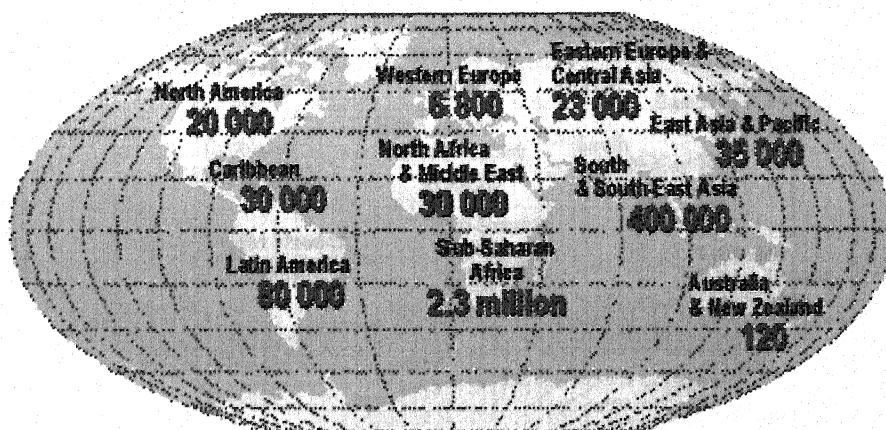
Total: 40 million

Estimated number of adults and children newly infected with HIV during 2001



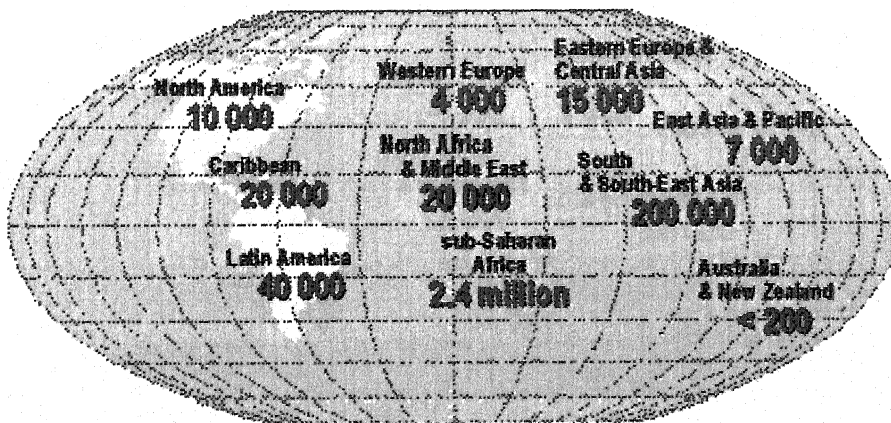
Total: 5 million

Estimated adult and child deaths from HIV/AIDS during 2001



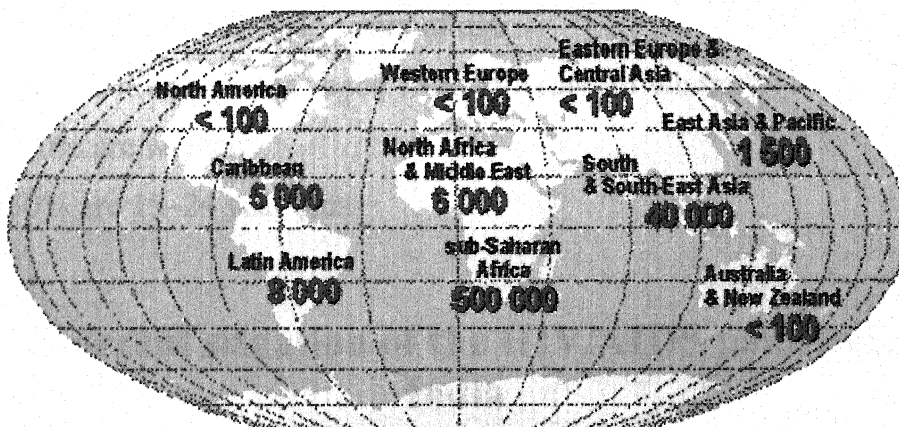
Total: 3 million

Children (<15 years) estimated to be living with HIV/AIDS as of end 2001



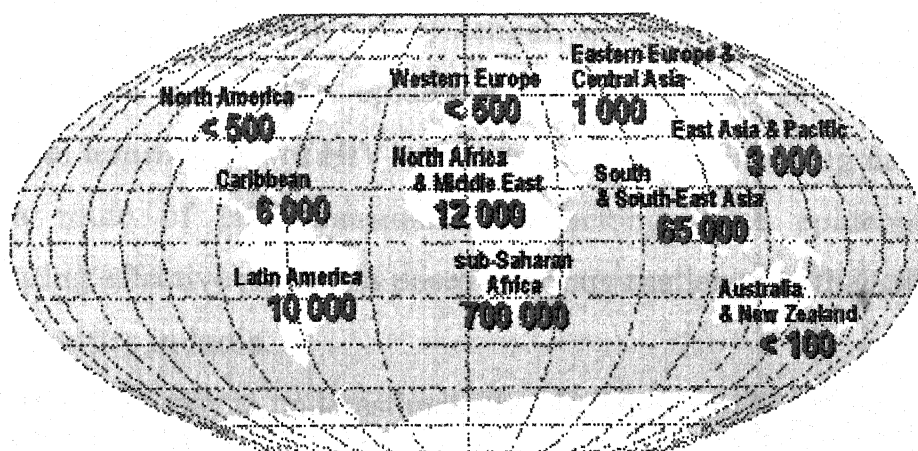
Total: 2.7 million

Estimated deaths in children (<15 years) from HIV/AIDS during 2001



Total: 580 000

Estimated number of children (<15 years) newly infected with HIV during 2001



Total: 800 000

About 14 000 new HIV infections a day in 2001

More than 95% are in developing countries

2000 are in children under 15 years of age

About 12 000 are in persons aged 15 to 49 years, of whom:

almost 50% are women

about 50% are 15–24 year olds

The current situation of the HIV/AIDS pandemic in India

India has had a sharp increase in the number of its people living with HIV, from a few thousand in the early 1990s to around 5.7 million adults and children in 2005. With a population of over one billion, the HIV epidemics in India will have a major impact on the overall spread of HIV in Asia and

the Pacific and indeed worldwide.

The spread of HIV within the country is as diverse as the societal patterns between its different regions, states and metropolitan areas. In fact, HIV in India exists in a number of epidemics, and in some places they occur within the same state. The epidemics vary, from states with mainly heterosexual transmission of HIV, to some states where injecting drug use is the main route of HIV transmission. Tracking these epidemics and implementing effective responses poses a serious challenge to the authorities and communities in India.

It would be easy to underestimate the challenge of HIV/AIDS in India. The country has a large population and population density, low literacy levels and consequently low levels of awareness, and HIV/AIDS is one of the most challenging public health problems ever faced by the country.

"How do you talk about HIV/AIDS to someone who does not know the basics about health and hygiene?" - Ratna Gaekwad, an outreach coordinator with the Delhi NGO Prayatna.

The early years of the response to HIV/AIDS in India

The first case of HIV infection in India was diagnosed among commercial sex workers in Chennai, Tamil Nadu, in 1986. Soon after, a number of screening centers were established throughout the country. Initially the focus was on screening foreigners, especially foreign students. Gradually, the focus moved on to screening blood banks. By early 1987, efforts were made to set up a national network of HIV screening centers in major urban areas.

A National AIDS Control Programme was launched in 1987 with the program activities covering surveillance, screening blood and blood products, and health education. In 1992 the National AIDS Control

Organization (NACO) was established. NACO carried out India's National AIDS Programme, which included the formulation of policy, prevention and control programmes.

The same year that NACO was established, the Government launched a Strategic Plan for HIV/AIDS prevention under the National AIDS Control Project. The Project established the administrative and technical basis for programme management and also set up State AIDS bodies in 25 states and 7 union territories. The Project was able to make a number of important improvements in HIV prevention such as improving blood safety.

Number of people affected by HIV/AIDS in India

Current estimates & future projections

According to UNAIDS, India has 5.7 million people living with HIV - more than any other country in the world.

- NACO estimated there were 5.21 million Indians living with HIV at the end of 2005 (compared to 4.58 million in 2002), of whom 39% were female.
- By the end of July 2005, the total number of AIDS cases reported in India was 111,608, of whom 32,567 were women. 37% of reported AIDS cases were diagnosed among people under 30. Many more AIDS cases go unreported.
- The UN Population Division projects that India's adult HIV prevalence will peak at 1.9% in 2019. The UN estimates there were 2.7 million AIDS deaths in India between 1980 and 2000. It has also projected that India would suffer 12.3 million AIDS deaths during 2000-15, and 49.5 million deaths during 2015-50.

- A 2002 report by the CIA's National Intelligence Council predicted 20 million to 25 million AIDS cases in India by 2010, more than any other country in the world.

HIV/AIDS surveillance

The number of HIV infections in India is difficult to determine. India's prevalence estimates are based solely on sentinel surveillance conducted at public sites. The country has no national information system to collect HIV testing information from the private sector, which provides 80% of health care in the country.

Although the HIV prevalence is low (0.9%), the overall number of people living with HIV in India is extremely high. Given India's large population, with most states having a population greater than the majority of countries in Africa, a mere 0.1% increase in the prevalence would increase the estimated number of people living with HIV/AIDS by over half a million.

HIV/AIDS orphans

Obtaining data on the number of children orphaned by AIDS is difficult. It is believed that the proportion of children in India orphaned by AIDS is far lower than in sub-Saharan Africa, but because of India's huge population the actual number of children already orphaned by AIDS is very high. In 2001 the number of orphaned children was already estimated at 1.2 million.

Although children are not yet being orphaned by HIV/AIDS on a large scale in most cities, studies have shown that the problem of orphans in some urban slum areas of India is already severe.

The HIV/AIDS situation in different states



Map of India showing the worst affected states.

There are a number of states in India where HIV prevalence among antenatal women is 1% or more, and these are considered to be high prevalence states. The prevalence data are derived from the screening of women attending antenatal clinics (ANC), meaning that these rates are only directly relevant to sexually active women. However, these rates can provide a reasonable estimate of HIV prevalence within the general population in each state.

The following states have recorded the highest levels of HIV prevalence at antenatal and sexually transmitted disease (STD) clinics over recent years.

Andhra Pradesh

Andhra Pradesh is a state in the southeast of the country with a total population of around 76 millions, of whom 6 millions live in or around the city of Hyderabad. The ANC prevalence was around 2% in both 2004 and 2005 - higher than in any other state. The vast majority of infections in Andhra Pradesh are believed to result from sexual transmission. HIV prevalence at STD clinics was 22.8% in 2005.

Goa

Goa is a very small state in the southwest of India, and is best known as a tourist destination. Tourism is so prominent that the number of tourists almost equals the resident population, which is about 1.3 million. The ANC prevalence was found to be above 1% in both 2002 and 2004, but was 0.5% in 2003 and 0% in 2005. This variation is likely due to the small number of women tested; the 2005 survey included only two ANC sites. Prevalence at STD clinics was 14% in 2005, indicating that Goa has a serious epidemic of HIV among sexually active people.

Karnataka

Karnataka - a diverse state in the southwest of India - has a population of around 53 million. In Karnataka the average ANC prevalence has exceeded 1% in all recent years. Districts with the highest prevalence tend to be located in and around Bangalore in the southern part of the state, or in northern Karnataka's "devadasi belt." Devadasi women are a group of women who have historically been dedicated to the service of gods. These days, this has evolved into sanctioned prostitution, and as a result many

women from this part of the country are supplied to the sex trade in big cities such as Mumbai. The average HIV prevalence among female sex workers in Karnataka was 18% in 2005.

Maharashtra & Mumbai

Mumbai (Bombay) is the capital city of Maharashtra state and is the most populous city in India, with around 20 million inhabitants. Maharashtra is a very large state of three hundred thousand square kilometres, with a total population of around 97 millions. The ANC prevalence in Maharashtra has exceeded 1% in all recent years, and surveys of female sex workers have found rates of infection above 20%. Very high rates are also found among injecting drug users and men who have sex with men.

Tamil Nadu

When surveillance systems in the southern Indian state of Tamil Nadu, home to some 62 million people, showed that HIV infection rates among pregnant women were rising - tripling to 1.25% between 1995 and 1997 - the State Government acted decisively. It set up an AIDS society, which worked closely with non-governmental organizations and other partners to develop an active AIDS prevention campaign. This included hiring a leading international advertising agency to promote condom use for risky sex in a humorous way, without offending the many people who do not engage in risky behaviour. The campaign also attacked the ignorance and stigma associated with HIV infection.

The ANC prevalence in Tamil Nadu was 0.88% in 2002 and 0.5% in 2005, though several districts still have rates above 1%. Prevalence among injecting drug users was 18% in 2005. Tamil Nadu had reported 52,036 AIDS cases to NACO by July 2005, which is by far the highest number of any state.

Manipur

Manipur is a small state of some 2.2 million people in the northeast of India. The nearness of Manipur to Myanmar (Burma), and therefore to the Golden Triangle drug trail, has made it a major transit route for drug smuggling, with drugs easily available. HIV prevalence among injecting drug users is above 20%, and the virus is no longer confined to this group, but has spread further to the female sexual partners of drug users and their children. The ANC prevalence in Manipur has exceeded 1% in all recent years.

Mizoram

The small northeastern state of Mizoram has fewer than a million inhabitants. In 1998, an HIV epidemic took off quickly among the state's male injecting drug users, with some drug clinics registering HIV rates of more than 70% among their patients. In recent years the average prevalence among this group has been much lower, at around 5%. ANC prevalence has exceeded 1% in most recent years, but was 0.88% in 2005.

Nagaland

Nagaland is another small northeastern state, with a population of two millions, where injecting drug use has again been the driving force behind the spread of HIV. In 2005, the ANC prevalence was 1.63%, and the rate among injecting drug users was 4.51%.

The groups most affected by HIV/AIDS

Although HIV/AIDS is still largely concentrated in at-risk populations, including sex workers, injecting drug users, truck drivers and men who have sex with men, the surveillance data suggest that the epidemic

is moving beyond these groups in some regions and into the general population. It is also moving from urban to rural districts.

"In some parts of India, particularly the states that are reporting the higher prevalence, the tipping point is long past. I think there is absolutely no doubt that the virus is moving into the general population." - Dr. R. Feachem, executive director of the Global Fund to Fight AIDS, Tuberculosis & Malaria.

In July 2003, Dr. Meenakshi Datta Ghosh, project director for NACO, stated that HIV/AIDS no longer affects only high-risk groups or urban populations, but is

"gradually spreading into rural areas and the general population".

The epidemic continues to shift towards women and young people. It has been estimated that around two in five adults living with HIV in India are women, and in 2004 it was estimated that 22% of HIV cases in India were housewives with single partner. The increasing HIV prevalence among women can consequently be seen in the increase of mother to child transmission of HIV, and infections among children.

The majority of the reported AIDS cases have occurred in the sexually active and economically productive 15 to 44 age group. The predominant mode of HIV transmission is through heterosexual contact, the second most common mode being injecting drug use. Previously blood transfusion and blood product transfusion were also major causes, but blood safety measures are now in place to prevent such transmission.

Migrants

Migration of economically productive sections of the population is a common phenomenon all over India. According to the 1993 National Sample Survey in India, 24.7% of the population had migrated, either within India, to neighbouring countries or overseas. Applying this percentage to the mid-

2003 population, about 264 million Indians are mobile.

"Being mobile in and of itself is not a risk factor for HIV infection. It is the situations encountered and the behaviours possibly engaged in during mobility or migration that increase vulnerability and risk regarding HIV/AIDS."

Most of the migrant workers are highly mobile and often live in unhygienic conditions in urban slums. Long working hours, relative isolation from the family and geographical mobility may foster casual sexual relationships and make them highly vulnerable to STDs and HIV/AIDS. Migrant workers tend to have little access to HIV/STD information, voluntary counselling and testing and health services. Cultural and language barriers worsen their lack of access to such services as do exist. Returning or visiting migrants, many of whom do not know their status, may infect their wives or other sex partners in the home community.

Sex workers

Although sex work is legal in some states, associated activities including soliciting and brothel keeping are penalised. Often women get involved with sex work because of poverty or marital break-up or they are forced into it.

Mumbai has the country's largest brothel based sex industry, with over 15,000 sex workers. It is estimated that in the region of 70% of the sex workers in Mumbai are HIV-positive. Sex workers in Mumbai are controlled by madams, pimps and moneylenders and because of this, reaching sex workers with HIV prevention is a major challenge. A study in Surat found that HIV prevalence among sex workers had increased from 17% in 1992 to 43% in 2000.

A positive outcome of a prevention programme amongst sex workers can be found in Sonagachi, in central Kolkata (Calcutta). The education

program initially targeted about 5,000 female sex workers. A team of two peer workers carried out outreach activities including education, condom promotion and follow-up of STI cases. When the project was launched in 1992, 27% of sex workers reported condom use. By 1995 this had risen to 82%, and in 2001 it was 86%.

Injecting drug users

HIV infections among injecting drug users (IDUs) first appeared in the northeastern state of Manipur. In Manipur City, the level of HIV infection increased from 61% in 1994 to 85% in 1997, and in 1998 it was 80.7%. Injecting drug use is also a major problem in urban areas such as Mumbai, Kolkata, Delhi and Chennai.

In India drugs are often used in open public places such as the roadside, parks, playgrounds and market complexes. Although India does not appear to have a widespread culture of professional injectors or 'street doctors', as in some Asian countries, there do appear to be shooting galleries where IDUs come to inject.

Generally, syringes and needles are purchased from pharmacies without any need for prescriptions, and although they are regarded as inexpensive many drug users tend to focus on buying the drug rather than purchasing new injecting equipment. The sharing of equipment among India's IDUs is widespread. Recent data indicate that most IDUs had at some stage shared their needle and syringe.

The majority of drug users in India are male. According to a study in the capital of Manipur, the prevalence of HIV infection in female IDUs was 57%, compared to 20% among female non-IDUs. However, use of drug treatment data may underestimate the number of female drug users, with women addicts being predominately a hidden population. In the northeast of India there is an increasing number of young widows of addicts, many of

whom are HIV-positive as a result of having been infected by their husbands.³¹ With the reported increase of HIV infection among wives and children of IDUs, this is highlighting the crucial need to reach the sex partners of IDUs with prevention, education, care and support services.

There is no government policy for harm reduction, leading to a lack of coordination in designing and implementing interventions. Some states, such as Manipur, have adopted their own harm reduction policies and consider that:

"Harm reduction is the urgent, practicable and feasible HIV prevention method among Injecting Drug Users and their sex partners."

Truck drivers



HIV/AIDS prevention among truck drivers in New Delhi, India

India has one of the largest road networks in the world and an estimated 2 to 5 millions long distance truck drivers and helpers. The extended periods of time that they spend away from their families place them in close proximity to "high-risk" sexual networks, and often results in them having an increased number of sexual contacts.

During their journeys the drivers often stop at 'dhabas', roadside hotels that usually provide food, rest, sex workers, alcohol and drugs. They pick up the women, use them and leave them at some other 'dhaba', where they are used by other drivers and local youths. As a result, truck drivers are crucial in spreading STDs and HIV infection throughout the country.

A study published in 1999 showed that 87% of the drivers had frequent and indiscriminate change of sexual partners, and only 11% of them used condoms although their AIDS knowledge was fairly good. HIV prevalence patterns in truckers have tended to mirror the local epidemics.

"There is no entertainment. It is day-in-day-out driving... When they stop, they drink, dine and have sex with women. Then they transfer HIV from urban to rural settings."

There have been a number of major HIV/STI prevention projects aimed at truckers. Some of these projects include not just truckers, but also other stakeholders such as gas station owners and employees. A specific example from Mumbai is the AIDS Workplace Awareness campaign which is mandatory and which targets the drivers at the regional transport authority, where the drivers get their licenses renewed annually.

Stigma and discrimination in India

In India, as elsewhere, AIDS is perceived as a disease of "others" - of people living on the margins of society, whose lifestyles are considered "perverted" and "sinful". Discrimination, stigmatisation and denial are the outcomes of such values, affecting life in families, communities, workplaces, schools and health care settings. Because of HIV/AIDS related discrimination, appropriate policies and models of good practice remain underdeveloped. People living with HIV and AIDS continue to be burdened by poor care and inadequate services, whilst those with the power to help do little to make the situation better.

In India the social reactions to people with AIDS have been overwhelmingly negative. For example, in one study 36% of people felt it would be better if infected people killed themselves, and the same percentage believed that infected people deserved their fate. Also,

34% said they would not associate with people with AIDS, and one fifth stated that AIDS was a punishment from God.

The health care sector has generally been the most conspicuous context for HIV/AIDS related discrimination, stigma and denial. Negative attitude from health care staff have generated anxiety and fear among many people living with HIV and AIDS. As a result, many keep their status secret, fearing still worse treatment from others. It is not surprising that among a majority of HIV positive people, AIDS-related fear and anxiety, and at times denial of their HIV status, can be traced to traumatic experiences in health care settings.

"There is an almost hysterical kind of fear ... at all levels, starting from the humblest, the sweeper or the ward boy, up to the heads of departments, which make them pathologically scared of having to deal with an HIV positive patient. Wherever they have an HIV patient, the responses are shameful."

Another example of discrimination concerns children of HIV-positive parents, whether positive or negative themselves, being denied the right to go to school or being separated from other children.

Stigma is also affecting prevention efforts, with the harassment of AIDS outreach workers and peer-educators being reported in 2002. Although the Indian government encourages NGOs to provide condoms and AIDS education to high-risk groups such as sex workers and men who have sex with men, it seemingly allows law enforcement agencies to harass outreach workers who provide those services.

THE joint World Health Organization (WHO)-United Nations Programme on HIV-AIDS (UNAIDS) Report on the Global HIV-AIDS Epidemic (June 1998) has estimated that there are about four million HIV-infected persons in India and the rate of HIV transmission in the adult population in the country is below 1 percent. Even this low percentage

makes India the country with the highest number of HIV-infected people in the world.

A recent study has estimated that there are 4,50,000 HIV-infected people among Tamil Nadu's adult population of 25 millions.

Overwhelmed by the enormity of the challenge, the National AIDS Control Organization (NACO) has worked hard to gauge the number of HIV-infected people in the country. Its attempts consist primarily of serosentinel surveillance through unlinked, anonymous HIV screenings in different subpopulation groups, such as pregnant women, patients attending sexually transmitted disease (STD) clinics, truck drivers and commercial sex workers. NACO estimates the prevalence of HIV infection to be around 1.22 per cent as of end-June 1998.

India has had a sharp increase in the estimated number of HIV infections, from a few thousands in the early 1990s to a working estimate of about 3.8 million children and adults living with HIV/AIDS in 2001. With a population of one billion, the HIV epidemics in India will have a major impact on the overall spread of HIV in Asia and the Pacific and indeed worldwide.

UNAIDS also found that HIV/AIDS related DSD in India was in some respects a gendered phenomenon. Women are often blamed by their parents and in-laws for infecting their husbands, or for not controlling their partners urges to have sex with other women. Children of HIV-positive parents, whether positive or negative themselves, are often denied the right to go to school or are separated from other children. People in marginalized groups (female sex workers, hijras (transgendered) and gay men) are often stigmatized in India on the grounds of not only HIV status but also being members of socially excluded group. (UNAIDS; India:, 2001: UNAIDS; 2000: World Bank reports; September 1999)

India is home to the largest number of people infected with HIV in Asia. An estimated 3.9 million Indians are living with HIV/AIDS, with an adult prevalence of 0.7 percent. Sentinel surveillance studies conducted in 1999 found HIV seroprevalence of greater than 1 percent in six of 32 states and territories. The epidemic is growing outside high-risk groups and beginning to move into the general population; it is also moving from urban to rural districts.

USAID: Leading the Fight Against HIV/AIDS Thursday, 20-Sep-2001 16:45:56 EDT As of April 2001, 212, 215 AIDS cases had been reported to the Ministry of Health, though this was thought to be a vast underestimate. HIV prevalence among pregnant women varies throughout the country, ranging from 0 percent to 2.6 percent.

Estimated Number of Adults and Children Living with HIV/AIDS,
end of 1999: 3.9 million

Total Population: 1 billion

Adult HIV Prevalence: 0.7%

HIV-1 Seroprevalence in Urban Areas:

Population at High Risk: 0.8%

Population at Low Risk: 0.3%

In India the official figure quoted in 1999 was 0.3 million HIV infected people and 68,000 cases of AIDS. Unofficially it is estimated that 4-10 million people are infected with HIV in India

Surveillance for HIV infection/AIDS cases in India (as reported to NACO)

I. HIV Sero Surveillance

Period of report up to: 30th June, 2000

	Cumulative	This month
Number of persons screened	3662969	10548
Number of persons sero-positive	98451	1143
Sero-Positivity Rate (Per thousand)	26.88	108.36

Break-up of Sero-Positive

Period of report up to: 30th June, 2000

ROUTE OF TRANSMISSION	SERO POSITIVE	PERCENTAGE
Sexual	48466	49.23
Through blood and blood products	6517	6.62
Through infected syringes and needles	3918	3.98
Perinatal transmission	353	0.36
Others (including suspected ARC/AIDS)	39197	39.81

Sero-Surveillance for HIV Infection

Period of report up to: 30th June, 2000 (Provisional)

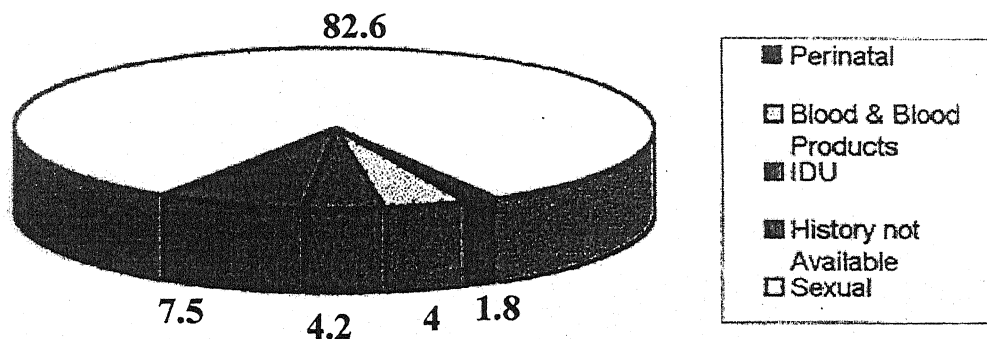
No	NAME	SCREENED	POSITIVE	Sero Positivity Rate (per thousand)
1.	Andhra Pradesh	74566	704	9.44
2.	Assam	17364	262	15.09
3.	Arunachal Pradesh	495	0	0.00
4.	Andaman & Nicobar Islands	18014	135	7.49
5.	Bihar	10203	45	4.41
6.	Chandigarh (U.T.)	57019	275	4.82
7.	Delhi	335594	1545	4.60
8.	Daman & Diu (U.T.)	250	8	32.00
9.	Dadra & Nagar Haveli	160	1	6.25
10.	Goa	77257	2864	37.07
11.	Gujarat	454372	1767	3.89
12.	Haryana	173305	735	4.24
13.	Himachal Pradesh	6095	157	25.76
14.	Jammu & Kashmir	8981	40	4.45
15.	Karnataka	420711	6415	15.25

16.	Kerala	44547	215	4.83
17.	Lakshadweep (U.T.)	1211	8	6.61
18.	Madhya Pradesh	112540	1084	9.63
19.	Maharashtra	447811	51321	114.60
20.	Orissa	93830	205	2.18
21.	Nagaland	9192	477	51.89
22.	Manipur	44542	7374	165.55
23.	Mizoram	44208	149	3.37
24.	Meghalaya	14284	61	4.27
25.	Pondicherry	92896	3479	37.45
26.	Punjab	1523	65	42.68
27.	Rajasthan	23621	639	27.05
28.	Sikkim	637	12	18.84
29.	Tamilnadu	778826	16034	20.59
30.	Tripura	6727	9	1.34
31.	Uttar Pradesh	128197	1717	13.39
32.	West Bengal	163991	649	3.96
Total:		3662969	98451	26.88

NATIONAL AIDS CONTROL PROGRAMME
AIDS CASES IN INDIA
NACO, ON 31ST MARCH, 2001

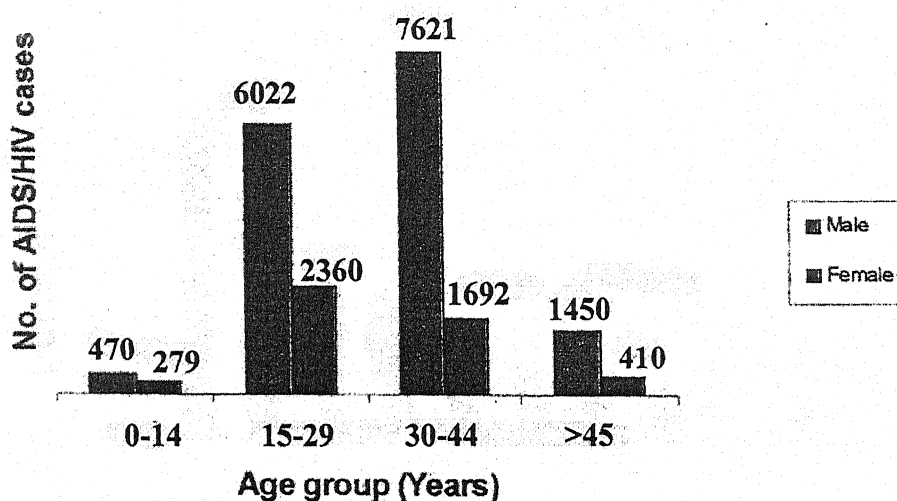
S.No.	State/UT	AIDS cases
1.	Andhara Pradesh	612
2.	Assam	110
3.	Arunachal Pradesh	0
4.	A & N Islands	13
5.	Bihar	44
6.	Chandigar (UT)	292
7.	Delhi	500
8.	Daman & Diu	1
9.	Dadra & Nagar Haveli	0
10.	Goa	29
11.	Gujarat	689
12.	Haryana	48
13.	Himachal Pradesh	85
14.	J & K	2
15.	Karnataka	918
16.	Kerala	267
17.	Lakshadweep	0
18.	Madhya Pradesh	664
19.	Maharashtra	4459
20.	Orissa	55
21.	Nagaland	103
22.	Manipur	790
23.	Mizoram	16
24.	Meghalaya	8
25.	Pondicherry	141
26.	Punjab	131
27.	Rajasthan	272
28.	Sikkim	2
29.	Tamil Nadu	9714
30.	Tripura	0
31.	Uttar Pradesh	282
32.	West Bangal	57
	Total	20304

Probable source of Infection of reported AIDS Cases in India (n = 20304) May 1986-March 2001



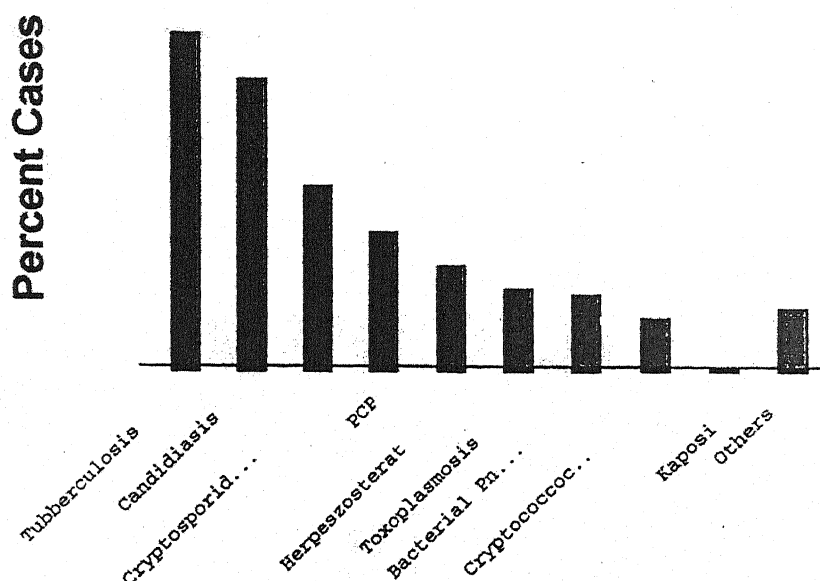
Source : NACO 2000-2001 (Combating HIV/AIDS in India 2000-2001)

Age & Sex distribution of reported AIDS Case in India (in = 20304) May 1986 March 2001



Source : NACO 2000-2001 (Combating HIV/AIDS in India 2000-2001)

Opportunistic Infections among Reported AIDS cases in India (n = 20304) May 1986 – March 2001



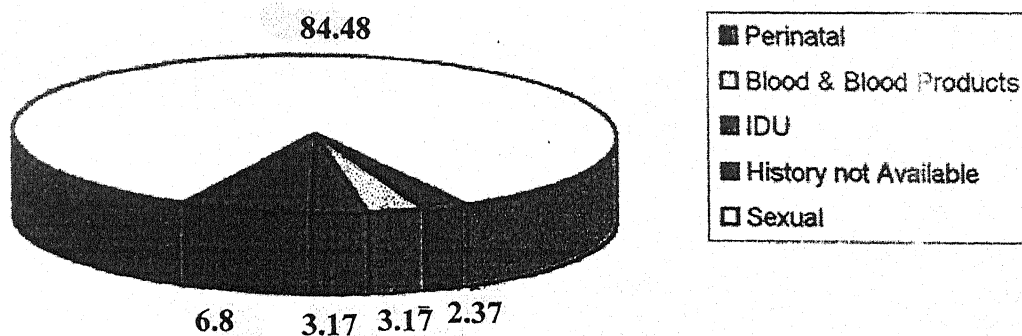
Source : NACO 1986-2001 (Combating HIV/AIDS in India 1986-2001)

HIV/AIDS SURVEILLANCE IN INDIA, NACO AS ON 31ST MAY, 2002

S.No.	State/UT	AIDS cases
1.	Andhara Pradesd	1523
2.	Assam	149
3.	Arunachal Pradesh	0
4.	A & N Islands	20
5.	Bihar	103
6.	Chandigar (UT)	511
7.	Delhi	676
8.	Daman & Diu	1
9.	Dadra & Nagar Haveli	0
10.	Goa	85
11.	Gujarat	1564
12.	Haryana	189
13.	Himachal Pradesh	95

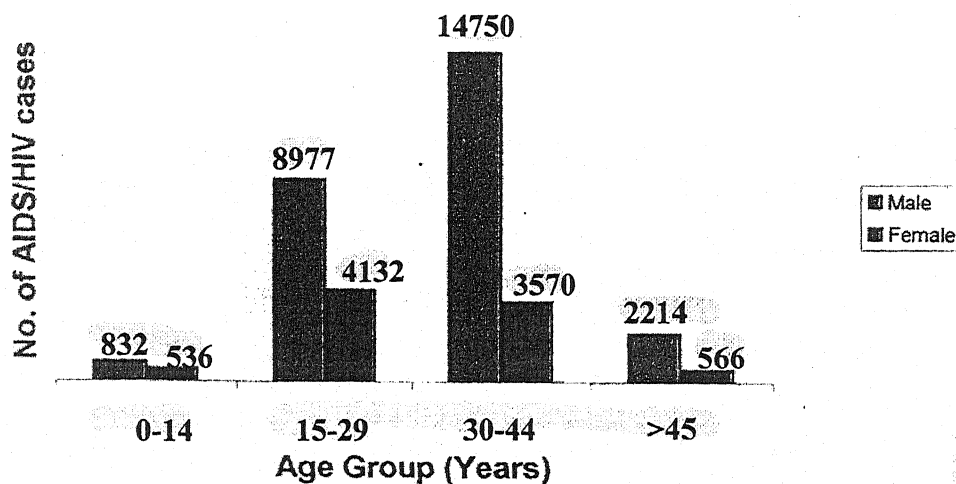
14.	J & K	2
15.	Karnataka	1337
16.	Kerala	267
17.	Lakshadweep	0
18.	Madhya Pradesh	859
19.	Maharashtra	7611
20.	Orissa	82
21.	Nagaland	238
22.	Manipur	1122
23.	Mizoram	24
24.	Meghalaya	8
25.	Pondicherry	157
26.	Punjab	203
27.	Rajasthan	427
28.	Sikkim	4
29.	Tamil Nadu	16677
30.	Tripura	2
31.	Uttar Pradesh	533
32.	West Bangal	831
33.	A, BAD Mun. Corp	267
	Total	35567

**Probable source of Infection of reported
AIDS/HIV cases in India
(n = 35567) 31st May, 2002**



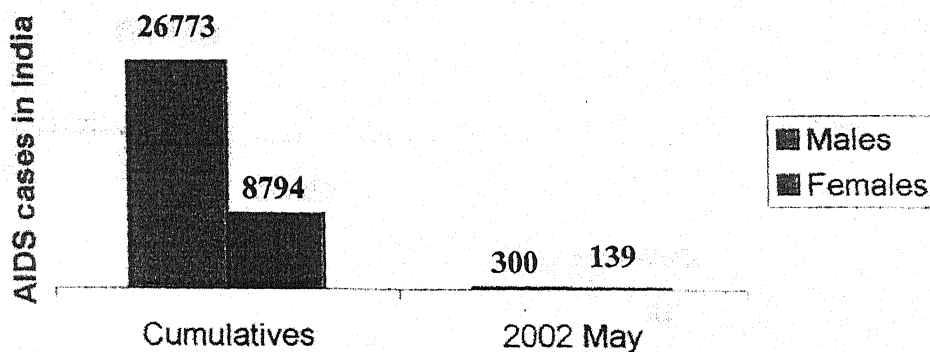
Source : NACO 31st May, 2002 (HIV/AIDS Surveillance in India 2002)

Age & Sex Distribution of AIDS/HIV Cases in India (n = 35567) 31st May, 2002



Source : NACO 31st May, 2002 (HIV/AIDS Surveillance in India)

HIV/AIDS Surveillance in India by NACO on 31st May, 2002



Source : NACO 31st May, 2002 (HIV/AIDS Surveillance in India 2002)

Surveillance for HIV infection/AIDS cases in India (as reported to NACO)

II. AIDS case surveillance (As on 31st March, 2003)

AIDS CASES IN INDIA	Cumulative	This Month
MALES	36411	3366
FEMALES	12522	1292
Total	48933	4658

RISK/TRANSMISSION CATEGORIES

	No. of cases	Percentage
Sexual	41633	85.08
Perinatal transmission	1299	2.65
Blood and blood products	1363	2.79
Injectable Drug Users	1287	2.63
History not available	3351	6.85
Total:	48933	100.00

Age group	Male	Female	Total
0 - 14 yrs	1138	711	1849
15 - 29 yrs.	11502	5806	17308
30 - 44 yrs.	20942	5289	26231
> 45 yrs.	2829	716	3545
Total	36411	12522	48933

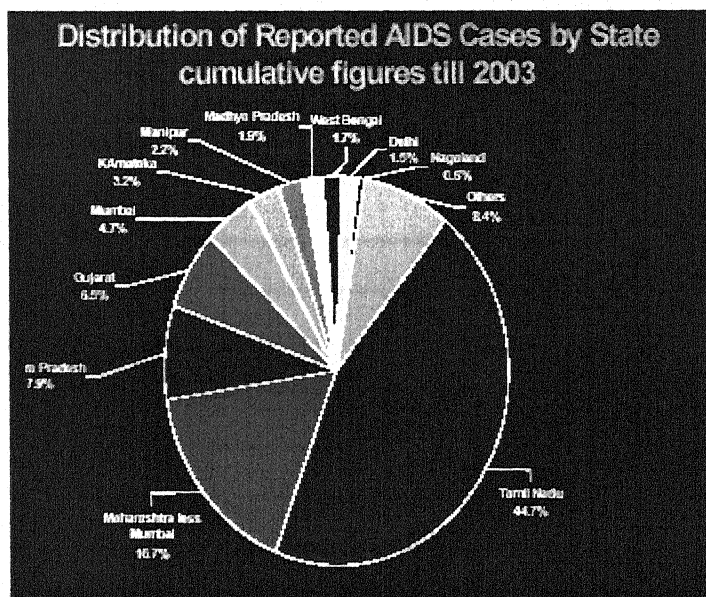
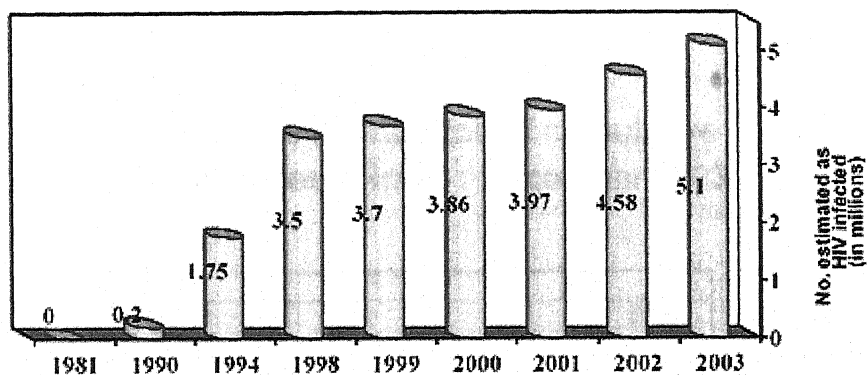
AIDS Cases in India (Reported to NACO)

(As on 31st March, 2003)

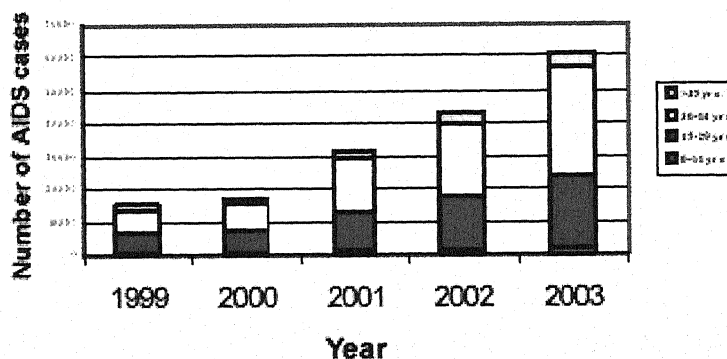
S. No.	State/UT	AIDS Cases
1	Andhra Pradesh	3341
2	Assam	149
3	Arunachal Pradesh	0
4	A & N Islands	24
5	Bihar	148
6	Chandigarh (UT)	684
7	Delhi	766
8	Daman & Diu	1
9	Dadra & Nagar Haveli	0
10	Goa	155
11	Gujarat	2474
12	Haryana	271
13	Himachal Pradesh	109
14	Jammu & Kashmir	2
15	Karnataka	1654
16	Kerala	267
17	Lakshadweep	0
18	Madhya Pradesh	972
19	Maharashtra	9234

20	Orissa	82
21	Nagaland	319
22	Manipur	1238
23	Mizoram	47
24	Meghalaya	8
25	Pondicherry	157
26	Punjab	231
27	Rajasthan	666
28	Sikkim	6
29	Tamilnadu	21813
30	Tripura	6
31	Uttar Pradesh	845
32	West Bengal	930
33	Ahmedabad M.C	267
34	Mumbai M.C	2067
	Total:	48933

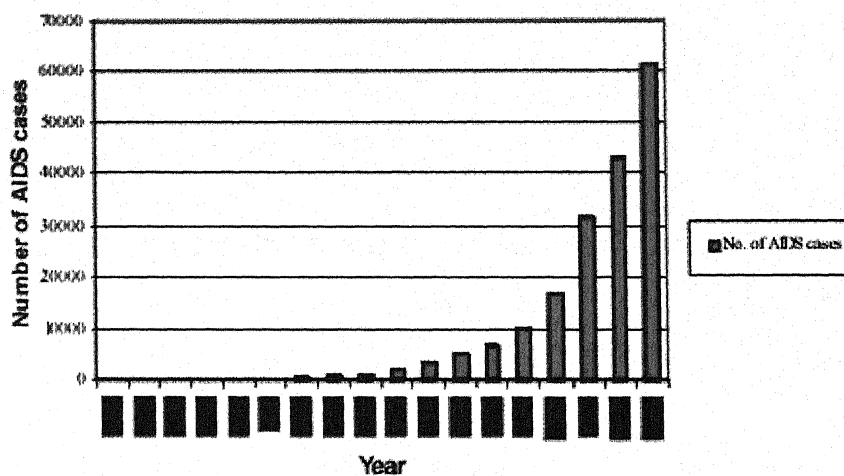
HIV Estimates : India 1981 to 2003



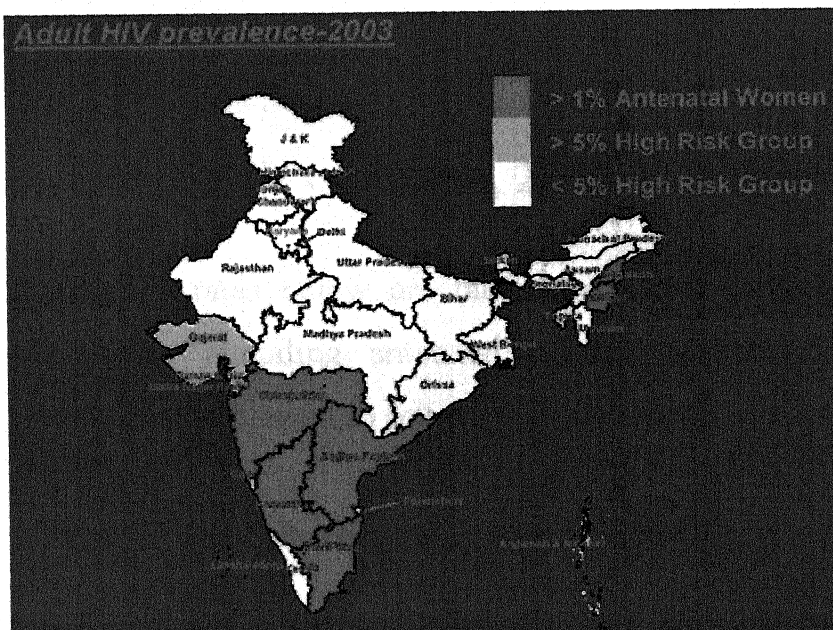
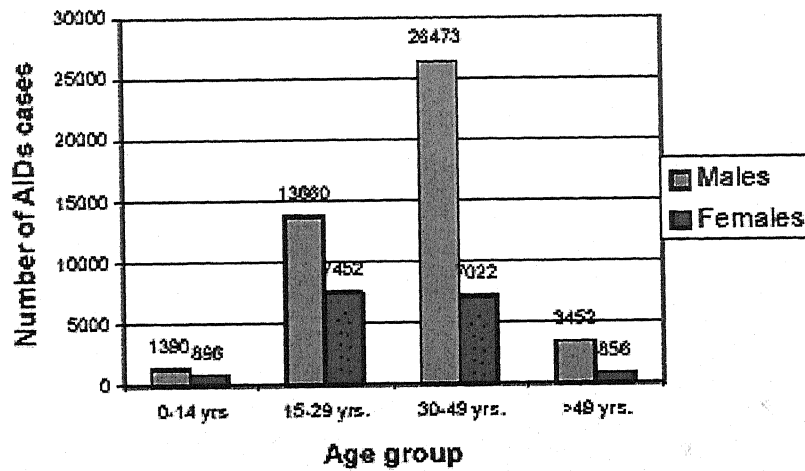
Age-wise distribution of cumulative AIDS cases in India : December 2003



Cumulative number of AIDS cases in India December 2003 (n=61201)



**Age & Sex distribution of AIDs cases in India :
December 2003**



Estimated numbers of adults and children living with HIV/AIDS, end of 2003

Group	Living with HIV/AIDS
Adults	5,000,000
Women	1,900,000
Children	120,000
Total	5,100,000
Adult HIV prevalence estimate	0.9%

These calculations are based on the previously mentioned estimates for 2001 and recent trends in HIV/AIDS surveillance in various populations. Adults are defined as men and women aged 15 to 49. These estimates include all those with HIV infection, whether or not they have developed symptoms of AIDS.

HIV estimates, 2003

The prevalence rates below are taken from data collected during screening of women attending antenatal clinics, meaning that these prevalence rates are only relevant to sexually active women.

State/Union Territory HIV Prevalence (%)

Andhra Pradesh	1.25
Arunachal Pradesh	0.38
Assam	0.00
A & N Islands	0.50
Bihar	0.00
Chandigarh	0.50

Chattisgarh (UT)	1.00
Daman & Diu	0.50
Delhi	0.13
D & N Haveli	0.13
Goa	0.50
Gujarat	0.40
Haryana	0.25
Himachal Pradesh	0.00
Jammu & Kashmir	0.00
Jharkhand	0.00
Karnataka	1.25
Kerala	0.33
Lakshdweep	0.00
Madhya Pardesh	0.00
Maharashtra	1.25
Manipur	1.25
Meghalaya	0.00
Mizoram	1.38
Mumbai	1.25
Nagaland	1.25
Orissa	0.00
Pondicherry	0.13
Punjab	0.00
Rajasthan	0.13
Sikkim	0.13
Tamil Nadu	0.75
Tripura	0.00

Uttar Pradesh	0.00
Uttranchal	0.00
West Bengal	0.50

AIDS data, August 2004

Gender Cumulative AIDS cases

Male	62050
Female	23978
Total	86028

The statistics for AIDS cases may be a poor guide to the severity of the epidemic, as in many situations a patient will die without HIV having been diagnosed, and the cause of death attributed to an opportunistic infection, such as tuberculosis or PCP.

Transmission Categories	Number of cases	%	Age group	Male	Female	Total
Sexual	73747	85.7%	0-14	2062	1357	3419
			15-29	18145	10776	28921
Perinatal	2704	3.1%	30-49	37033	10576	47609
Blood and blood products	1863	2.2%	≥50	4180	1269	6079
			Total	62050	23978	86028
Injecting drug users	2539	3.0%				
Others (not specified)	5175	6.0%				
Total	86028	100%				

State/Union Territory AIDS cases

Andhra Pradesh	8800
Assam	225
Arunachal Pradesh	0
A & N Islands	33
Bihar	155
Chandigarh (UT)	939
Delhi	917
Daman & Diu	1
Dadra & Nagar Haveli	0
Goa	440
Gujarat	4562
Haryana	375
Himachal Pradesh	149
Jammu & Kahmir	2
Karnataka	2024
Kerala	1769
Lakshadweep	0
Madhya Pradesh	1182
Maharashtra	12665
Orissa	128
Nagaland	507
Manipur	2866
Mizoram	87
Meghalaya	8
Pondicherry	302
Punjab	292

Rajasthan	1089
Sikkim	8
Tamil Nadu	37087
Tripura	5
Uttar Pradesh	1383
West Bengal	2397
Ahemdabad M C	267
Mumbai MC	5364

Estimated number of people living with HIV/AIDS, end of 2005

Group	Living with HIV/AIDS
Adults and children	5,700,000
Adults	5,600,000
Women	1,600,000
Adult HIV prevalence estimate	0.9%

These are UNAIDS/WHO estimates. Adults are defined as people aged 15 or above. These estimates include all those with HIV infection, whether or not they have developed symptoms of AIDS.

The Indian National AIDS Control Organization (NACO) estimates that 5.21 millions people were living with HIV in 2005, giving an adult prevalence of 0.91%. This represents a slight increase from the 2004 estimate, and a substantial increase from 4.58 million in 2002.

AIDS data, end of July 2005

Gender	Cumulative AIDS cases
Male	79,041
Female	32,567
Total	111,608

The statistics for AIDS cases may be a poor guide to the severity of the epidemic, as in many situations a patient will die without HIV

having been diagnosed, and with the cause of death attributed to an opportunistic infection, such as tuberculosis.

According to UNAIDS/WHO, between 270,000 and 680,000 Indians died of AIDS in 2005.

Transmission Categories	Number of cases	%	Age group	Male	Female	Total
Sexual	95,941	86%	0-14	2,860	1,994	4,854
Perinatal	4,059	4%	15-29	21,782	14,405	36,187
Blood and blood products	2,231	2%	30-49	48,342	14,508	62,850
Injecting drug users	2,672	2%	≥50	6,057	1,660	7,717
Others (not specified)	6,705	6%	Total	79,041	32,567	111,608
Total	111,608	100%				

State/Union Territory	AIDS cases
A & N Islands	33
Andhra Pradesh	12,349
Arunachal Pradesh	0
Assam	225
Bihar	155
Chandigarh (UT)	1,260
Chattisgarh	0
Daman & Diu	1
Dadra & Nagar Haveli	0
Delhi	970
Goa	567
Gujarat	5,636
Haryana	486
Himachal Pradesh	252
Jammu & Kashmir	2
Jharkhand	0
Karnataka	2,896
Kerala	1,769
Lakshadweep	0
Madhya Pradesh	1,396
Maharashtra	13,747
Manipur	2,866

Meghalaya	8
Mizoram	106
Nagaland	736
Orissa	467
Pondicherry	302
Punjab	292
Rajasthan	1,153
Sikkim	8
Tamil Nadu	52,036
Tripura	5
Uttar Pradesh	1,383
Uttranchal	0
West Bengal	2,397
Ahemdabad MC	621
Chennai MC	0
Mumbai MC	7,484
Total	111,608

HIV estimates, 2005

The prevalence rates below are taken from data collected during screening of women attending antenatal clinics.

State/Union Territory	HIV prevalence (%)
A & N Islands	0.58
Andhra Pardesh	2.00
Arunachal Pradesh	0.43
Assam	0.00
Bihar	0.00
Chandigarh	0.00
Chattisgarh	0.25
D & N Haveli	0.30
Daman & Diu	0.13
Delhi	0.25
Goa	0.00
Gujarat	0.25
Haryana	0.13
Himachal Pradesh	0.13
Jammu & Kashmir	0.00
Jharkhand	0.13

Karnataka	1.25
Kerala	0.25
Lakshdweep	0.00
Madhya Pardesh	0.25
Maharashtra	1.25
Manipur	1.25
Meghalaya	0.00
Mizoram	0.88
Nagaland	1.63
Orissa	0.25
Pondicherry	0.25
Punjab	0.13
Rajasthan	0.13
Sikkim	0.30
Tamil Nadu	0.50
Tripura	0.00
Uttar Pradesh	0.00
Uttranchal	0.00
West Bengal	0.84

Some areas report an HIV prevalence rate of 0 in antenatal clinics. This does not necessarily mean that there is no HIV in the area, as some of them report the presence of the virus at STD clinics and amongst injecting drug users. In many states and territories, the average antenatal HIV prevalence is based on reports from fewer than five clinics.

HIV prevalence among different population groups

The average HIV prevalence among women attending antenatal clinics in India is 0.88%. Much higher rates are found among people attending sexually transmitted disease clinics (5.66%), female sex workers (8.44%), injecting drug users (10.16%) and men who have sex with men (8.74%).

Rates vary widely between regions, and exceed 20% among female sex workers in Maharashtra, injecting drug users in Delhi and Manipur, and men who have sex with men in Delhi.

MATERIAL AND METHODS

3. Material and Methods

3.1 Survey Area :-

Survey Area includes three cities namely Jhansi, Lalitpur and Orai. Jhansi is the head quarter of Bundelkhand division.

3.2 Climate :-

Climate of the area is hot and dry. Mean monthly maximum and minimum temperature usually ranges between 24.1⁰C to 42.6⁰ C in summers and 9.2⁰C to 39.3⁰C in winter seasons respectively.

3.3 STUDY UNIT :-

The study unit for the purpose of this study, was an individual of different high risk groups for example- commercial sex workers, Truck drivers, Jail inmates, Police and PAC personnel and low risk groups for example students, teachers and paramedical staff.

3.4 STUDY AREA

The Present study was undertaken in the following high-risk groups for HIV/AIDS in above mentioned cities.

- I. **Jail inmates-** jail inmates were from District jails of Jhansi, Lalitpur and orai.
- II. **Police Personnels-** Police Personnels were from the Police Line and Thana Nawabad of Jhansi city, police line of Lalitpur and Orai city.
- III. **PAC personnels-** They were from P.A.C. vahini 33 near Rajgarh, Jhansi.
- IV. **Truck drivers-** They were studied on road-sides on Kanpur Jhansi road opposite M.L.B. medical college and Hospital, Jhansi and on

highway in Lalitpur

- V. **Commercial sex workers-** They were studied on road side Juggi-Jhopri near railway station Jhansi, Elite crossing, Mission Compound, Gudri in Manik Chowk, villages near BHEL in Jhansi city, Juggi-Jhopri and slums in Lalitpur and Orai, as there is no well defined area for these people. They were in dispersed form. Their names were taken from Kotwali and other Police Stations and from some NGO'S.

The present study was undertaken in following low risk groups for HIV/AIDS in above mentioned cities.

- 1) **Students-** Graduate and postgraduate students studying in various degree colleges affiliated to Bundelkhand University and students of Bundelkhand University it self, were studied under this group.
- 2) **Teachers-** Teachers of various schools and colleges of Bundelkhand region in general were studied under this group.
- 3) **Medical Personnels-** Under this, nurses and ward boys of civil hospital, Jhansi Lalitpur and Orai M.L.B. Medical College, were studied.

3.5 THE QUESTIONNAIRE

The required data were collected on a pre-designed questionnaire (See, Annex 1) by direct personal interviews method. This questionnaire had five parts. Part I was designed to collect data on socio-demographic characteristics of respondents, part II had questions to assess the respondents, knowledge on HIV/AIDS part III assessed their opinion on HIV/AIDS, part IV was framed to assess sources of infection of HIV/AIDS and part V included details of investigations. Most of the questions were close with multiple choice answers.

3.6 SURVEY TECHNIQUES

The survey was carried – out from 1 January 2001 to 31 October 2005 by the investigator herself, using departmental resources, particularly the help of the working technician in Microbiology department of M.L.B. Medical College. Help of lab technician was sought, at times for collection and transportation of blood samples.

During the survey, firstly the written consent was taken from each individual after detailing them about aim and procedure of the study. On an average, 20-25 minutes were spent for interviewing and in taking blood samples from each individual. Individuals were interviewed and investigated separately. An effort was made to contact maximum number of high risk/low risk individuals of these groups. After completion of interview, 5ml blood was taken by using disposable needles and syringes, later on, blood was centrifuged and serum was separated on the same day and the serum was stored at, -20°C in the Department of Microbiology of the institution. Every attempt was made to ensure the confidentiality of blood samples results.

3.7 LABORATORY TESTS INCLUDING STRATEGIES OF TESTING

LABORATORY TESTS

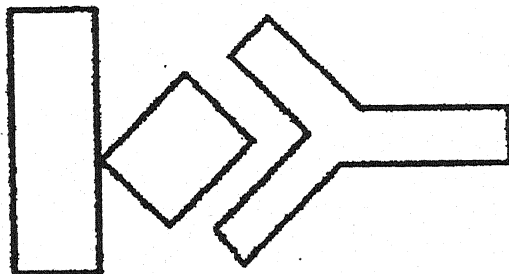
All the coded serum samples were subjected to HIV EIA (Lab systems) a solid phase enzyme immunoassay for detection of antibodies of HIV-1 and HIV-2 in human serum or plasma.

The repeated ELISA positive samples were further subjected to testing with rapid methods like TRIDOT, CAPPILUS, UNIGOLDTM etc.

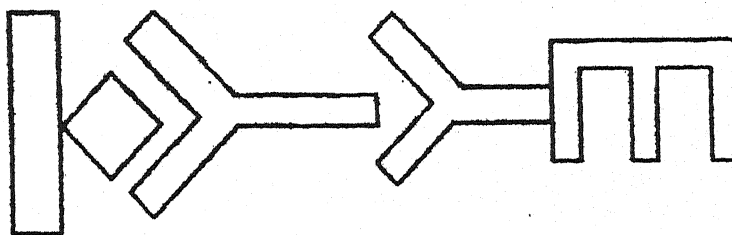
PRINCIPLE OF ELISA TEST

The principle of HIV EIA test is based on an indirect solid -phase enzyme immunoassay with horseradish peroxidase as the marker enzyme. The assay proceeds according to the following reactions.

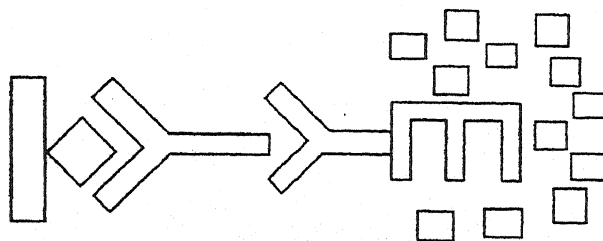
- 1) When present in patient serum HIV antibodies (►) combine with HIV peptide (◊) attached to polystyrene surface (▮) of the microstrip wells.



- 2) Residual patient sample is removed by washing and horseradish peroxidase conjugated anti-human IgG sheep antibody (►m) is added.

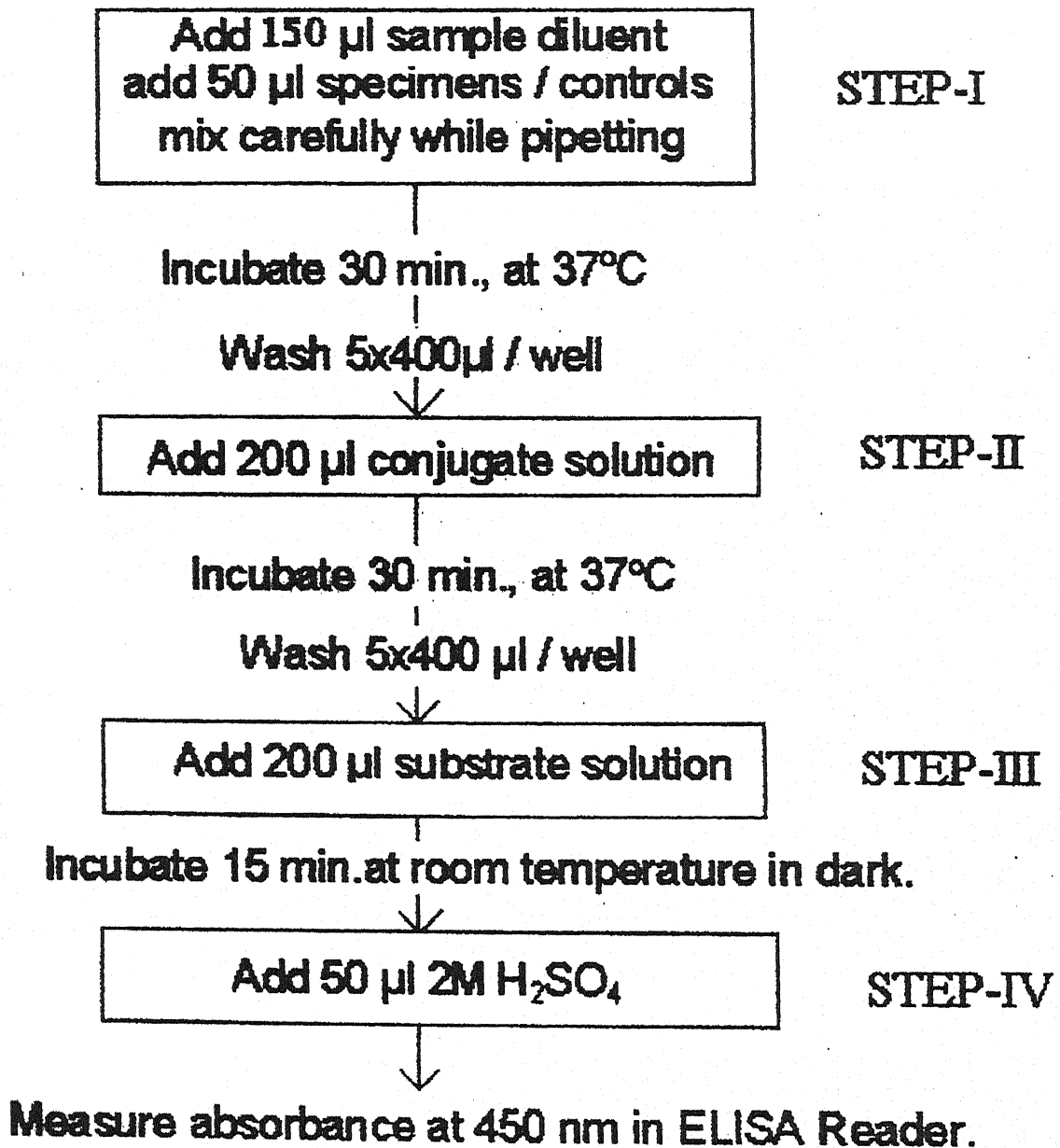


- 3) Wells are washed and a colourless enzyme substrate (H_2O_2) and chromogen Tetramethyl benzidine (TMB), a non-mutagenic chromogen for horseradish peroxidase are added. The enzyme reaction of chromogen / substrate produces a coloured end product.



- 4) Enzyme-chromogen/substrate reaction is terminated with acid (H_2SO_4). The colour intensity is directly related to the concentration of HIV antibodies in a patient sample.

TEST PROCEDURE
OUTLINE OF THE PROCEDURE



QUALITY CONTROL VALUES

QC Samples

Expected Values at 450 nm

(In absorbance unit)

Reagent Blank	≤ 0.10
Negative Control (3a)	$\leq 0.15 \quad x)$
Positive control 1 (3b)	$0.70 \leq \text{Apc 1} < 2.00 \quad x)$

x) The absorbance of the reagent blank has already been subtrated from these values.

ABBREVIATIONS

A	=	Absorbance
Arb	=	Mean absorbance of the reagent blank.
Apcl	=	Mean absorbance of the positive control 1 (3b)
CO	=	The cut-off value in absorbance units.

When the microplate reader is blanked against the reagent blank the following formula was used for cut off.

$$\text{CO} = 0.3 \times \text{Apcl}$$

When the microplate reader is NOT blanked against the reagent blank, the cut -off formula is.

$$\text{CO} = 0.3 \times (\text{Apcl} - \text{Arb}) + \text{Arb}$$

INTERPRETATION OF THE RESULTS

RESULT

INTERPRETATION

< CO

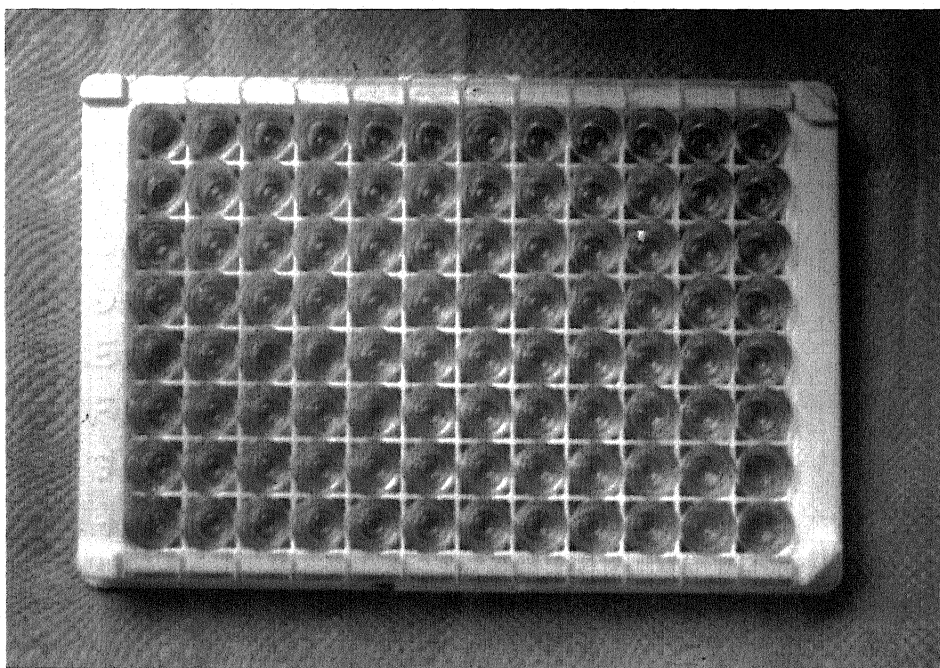
A negative result means that the sample tested either contains no antibodies to HIV or the antibody level is below the detection limit of the test Kit. With negative test results, when infection is suspected, it is advised to repeat the test with a new serum sample taken 2-4 weeks later.

≥ CO

An initially reactive test result has to be retested. Only after receiving a repeatedly reactive results, the sample may be presumed to contain antibodies to HIV. The result should be verified with a recognized confirmatory test.

As with other immunoassays, occasional false positive results may occur, which are in most instance non-repeatable. It is therefore recommended to retest all samples giving an initially positive result.

ELISA PLATE



The Photograph of ELISA Plate showing 5 positive samples in which 3 are of Truck Drivers of Jhansi and other 2 samples are of M.L.B. Medical College, Microbiology Department.

OBSERVATION OF ELISA PLATE

The ELISA Plate showing 96 wells. In which

A1 → Blank (0.033)

B1 → Negative Control (0.046)

C1 → Positive Control (2.435)

By photograph we can watch 5 positive cases of HIV infection in the wells D2, H1, A7, D7 and F10 shown in the yellow colour. In these positive cases of HIV infection the sample of Truck Drivers found to be positive are in the wells

A7 → (1.966)

D7 → (1.911)

F10 → (1.857)

DESCRIPTION OF ELISA PLATE WELLS

The samples of Truck Drivers are

A2 – A12

B2 – B12

C2 – C12

D2 – D12

E2 – E12

F2 – F12

G2 – G12

H2 – H12

The samples of M.L.B. Medical College, Microbiology Deptt. Jhansi

Are : - D1, D2, E1, F1, G1 and H1.

RAPID METHODS

The samples give positive results in the ELISA TEST are further subjected to RAPID METHODS for the confirmations of positive results.

The Rapid Methods used are :-

i) UNI-GOLD

ii) TRIDOT

UNIGOLD

The Trinity Biotech Uni-GoldTM HIV test is a single reagent assay for the detection of antibodies to human immunodeficiency virus type-1 and 2 in serum, plasma or whole blood.

PRINCIPLE

Recombinant proteins representing the immunodominant regions of the envelope proteins of HIV-1 and HIV-2, glycoprotein gp41, gp120 (HIV-1) and glycoprotein gp36 (HIV-2) respectively are immobilized at the test region of the nitrocellulose strip. These proteins are also linked to colloidal gold and impregnated below the test region of the device. A narrow band of the nitrocellulose membrane is also sensitized as a control region.

During testing two drops of serum, plasma or whole blood is applied to the sample port, followed by two drops of wash buffer and allowed to react. Antibodies of any immunoglobulin class, specific to the recombinant HIV-1 or HIV-2 proteins, will react with the colloidal gold complex moves chromatographically along the membrane to the test and control regions of the test device. A positive reaction is visualized by a pink/red band in the test region of the device.

A negative reaction occurs in the absence of human immunoglobulin antibodies to HIV in the analyzed specimen. Consequently no visually detectable band develops in the test region of the device.

Excess conjugate forms a second pink/red in the control region of the device. The appearance of this band indicates proper performance of the reagents in the kit.

QUALITY CONTROL

Good Laboratory Practice necessitates the use of control specimens to ensure proper device performance at least once daily.

A built in procedural control on the test device indicates that the test is functioning correctly. A pink/red band should always appear at the control window.

TEST PROCEDURE

- 1) If any reagent / sample has been in refrigerated storage, remove and allow to stand for at least 20 minutes to reach room temperature.
- 2) Remove the required number of Trinity Biotech Uni-Gold™ HIV test devices from their protective wrappers.
- 3) Label each test with the appropriate patient information.
- 4) Using one of the disposable pipettes supplied, fill with sample (serum/ plasma/ whole blood).
- 5) Holding the pipette over the sample port add two drops of sample (approx. 60µl) carefully.
- 6) Add 2 drops (approx. 60µl) of the wash reagent to sample port.
- 7) Allow 10 minutes for reaction to occur. The result should be read at the

end of the 10 minutes incubation time. Results are stable for at least 20 minutes after addition of sample to the device.

INTERPRETATION OF TEST RESULTS

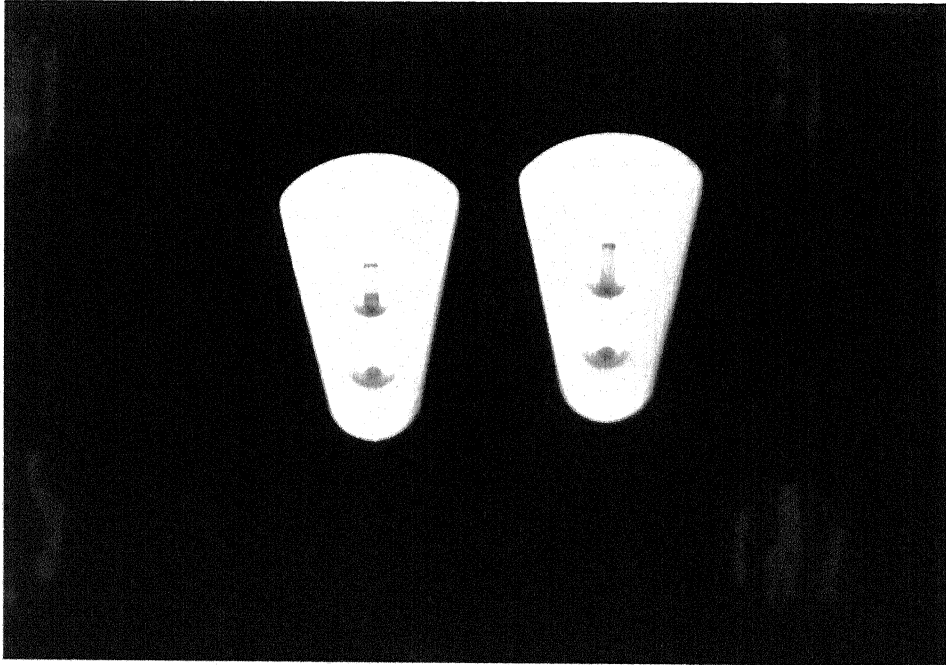
NEGATIVE

A line in the control region only indicates a negative test result.

POSITIVE

A line of any intensity forming in the test region, plus a line forming in the control region, indicates a positive result.

UNI – GOLD™ TEST



The Photograph of Uni-Gold™ Test
(Left one → Showing 2 bands 1st in Test Region and 2nd in
Control Region indicates positive reaction)
(Right one → Showing only one band in Control Region
indicates negative reaction)

TRIDOT

The HIV TRI-DOT test is a visual, rapid, sensitive and accurate immunoassay for the differential detection of HIV-1 and HIV-2 antibodies in human serum or plasma using HIV-1 and HIV-2 antigens immobilized on an immunofiltration membrane. The test is a screening test for anti-HIV-1 and anti-HIV-2 and is for *in vitro* lab use only.

PRINCIPLE

HIV antigens are immobilized on a porous immuno-filtration membrane. Sample and solutions pass through the membrane and are absorbed into the underlying absorbent.

As the patient's sample passes through the membrane, HIV antibodies, if present, bind to the immobilized antigens.

Conjugate binds to the Fc portion of the HIV antibodies to give distinct pinkish purple DOT (s) against a white background.

TEST PROCEDURE

- 1) Add 3 drops of buffer solution to the center of the device.
- 2) Hold the dropper vertically and add 1 drop of patient's sample using the sample dropper provided (Use a separate sample dropper for each specimen to be tested).
- 3) Add 5 drops of Buffer Solution.
- 4) Add 2 drops of protein -A Conjugate directly from the conjugate vial.
- 5) Add 5 drop of Buffer Solution and read result.

IMPORTANT :- IT IS IMPORTANT TO ALLOW EACH SOLUTION TO SOAK IN THE TEST DEVICE BEFORE ADDING THE NEXT SOLUTION.

INTERPRETATION OF RESULTS

NEGATIVE RESULT -

If only one DOT (only the control Dot) appears, the specimen is non reactive for antibodies either to HIV-1 or HIV-2. Interpret sample as non -reactive.

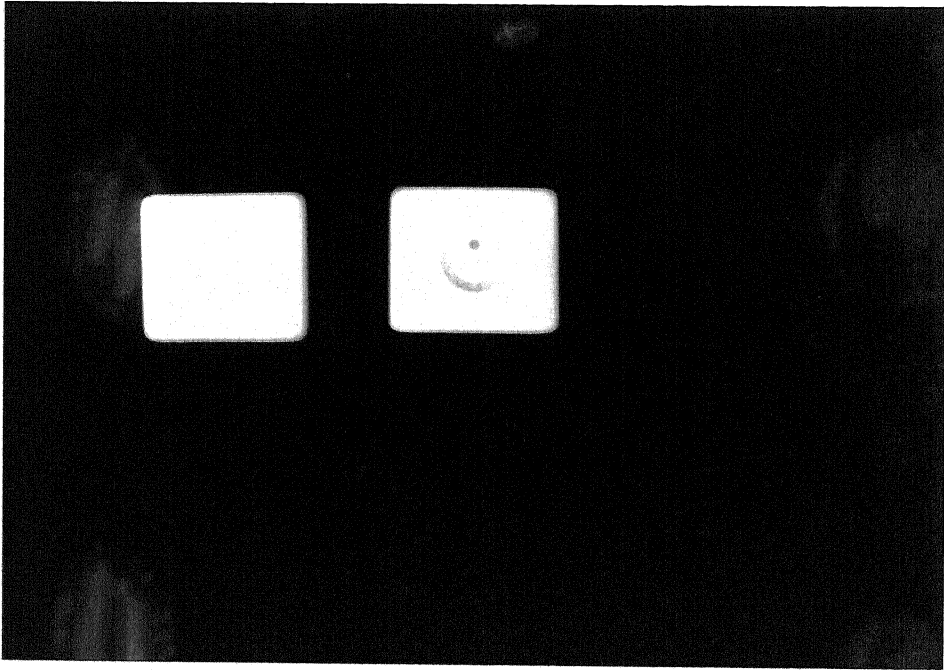
POSITIVE RESULT -

- 1) If two DOTS, one for the control and the other for HIV-1 appear, the specimen is reactive for antibodies to HIV-1.
- 2) If two DOTS, one for the control and the other for HIV-2 appear, the specimen is reactive for antibodies to HIV-2.
- 3) If all the three DOTS, one each for control, HIV-1 and HIV-2 appear, the specimen is reactive for antibodies to HIV-1 and HIV-2.

INVALID TEST -

If no DOT appears after the test is complete, either with clear background or with complete pinkish/purple background the test indicates ERROR.

TRIDOT TEST



The Photograph of Tridot Test

(Left one → Showing one round pink dot in Control Region indicates negative reaction)

(Right one → Showing two round pink dots. 1st in Control Region and 2nd in HIV-1 region, indicates positive reaction with infection of HIV-1)

3.7 SOCIO-ECONOMIC STATUS

Socio-economic status of the individual was recorded, social classification of study subjects here is based on the mean monthly per capita income, as recommended by Prasad (1961). The criteria used here, and given below is, in fact, an improvement over that of Prasad (1961). The method proposed by Kumar (1993) was used, to make classification update. We have used (2000-2001) consumer price index of Uttar Pradesh.

SOCIAL CLASSIFICATION

Mean monthly per capita income (Rs.)	Social Class
5080 & above	I
2640 – 5279	II
1590 – 2639	III
790 – 1589	IV
< 790	V

Prasad (1970) classification was not used as it has become obsolete due to the considerable decline in the purchasing power of the rupee.

3.8 STATISTICAL ANALYSIS OF DATA

All the tables were shown in respect of numbers and percentages, statistical analysis of the data done to compute the prevalence rates of HIV amongst high risk groups and the association of various socio-demographic variables, risk factors, with the prevalence rates. The students 't' test was used, to determine the P value and the show the significance of association between the two variables.

The formula used was –

$$t = \frac{p_1 - p_2}{\sqrt{pq\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$

Where, t = test statistics
 p1 = prevalence of Ist group
 p2 = prevalence of IInd group
 n3 = Number of study subjects in Ist group
 n2 = number of study subjects in IInd group

$$P = \sqrt{\frac{(P_1)^2 (n_1 - 1) + (P_2)^2 (n_2 - 1)}{n_1 + n_2 - 2}}$$

$$q = 100 - P$$

Degree of freedom (d.f.) was calculated by –

$$\text{d.f.} = n_1 + n_2 - 2$$

Level of Significance : $\alpha = 0.10; .025; .005$

Critical value : The tabulated Critical value of t at $\alpha = 0.10; .025; .005$ and $n_1 + n_2 - 2$ i.e. ∞ (infinity) degrees of freedom is $t_{0.10, \infty} = 1.282$; $t_{0.025, \infty} = 1.960$; $t_{0.005, \infty} = 2.596$

Results were interpreted as :

If $t (\text{Calculated}) \geq t_{0.005, \infty} = 2.596$ HIGHLY SIGNIFICANT

$t (\text{Calculated}) \geq t_{0.025, \infty} = 1.960$ SIGNIFICANT

$t (\text{Calculated}) \geq t_{0.10, \infty} = 1.282$ SIGNIFICANT

$t (\text{Calculated}) < t_{0.10, \infty} = 1.282$ NOT SIGNIFICANT

OBSERVATIONS

4. OBSERVATIONS

The present study was undertaken in five high risk groups viz. commercial sex workers, Truck drivers, Police and P.A.C. personnel and in Jail-inmates and Three low risk groups viz. Students, Teachers and Paramedical Staff. Due to time limitations and refusal of respondents to participate, only 1613 respondents from different groups could be studied.

[A] 4 HIGH RISK GROUP STUDY POPULATION

[A] 4.1 SOCIO-DEMOGRAPHIC PROFILE OF HIGH RISK GROUP STUDY POPULATION

Data were gathered for the following variables.

[A] 4.1.1 Age and sex : distribution of respondents by age and sex in different high-risk groups are shown in Table- 1. Highest number of respondents were in 26-54 years age group (68.01%), followed by 18-25 years age group (28.79%). Most of the participants were males (80.43%) and only 19.57% were females. There were no female participates among truck drivers and P.A.C. personnel.

[A] 4.1.2 Marital status : Most of the respondents (70.14%) were married and about 1/4th (28.80%) respondents were unmarried (Table-2). In Jail-inmates there was very little difference between married (54.63%) and unmarried (43.42%) respondents, while percentage of unmarried respondents was least in P.A.C. personnel (7.23%). Very few respondents were either divorcee (0.53%) or widow/widower (0.53%)

Table : 1 Study subjects by age and sex

Age Groups (Years)	C.S. Ws		Truck Drivers		Police Personnel		P.A.C. Personnel		Jail inmates		Total			
											Male		Female	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	No.	%	No.	%
18-25	NIL	119	121	NIL	17	2	29	NIL	87	3	254	24.05	124	48.25
26-54	NIL	110	358	NIL	169	10	135	NIL	107	4	769	72.82	124	48.25
≥ 55	NIL	9	23	NIL	4	NIL	2	NIL	4	NIL	33	3.13	9	3.50
Total	NIL	238	502	NIL	190	12	166	NIL	198	7	1056	100.00	257	100.00

Table : 2 Study subjects by marital status

Marital Status	C.S. Ws		Truck Drivers		Police Personnel		P.A.C. Personnel		Jail inmates		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Unmarried	134	56.30	125	24.90	18	8.91	12	7.23	89	43.42	378	28.8
Married	98	41.18	375	74.70	182	90.10	154	92.77	112	54.63	921	70.14
Divorcee	5	2.10	2	0.40	NIL	NIL	NIL	NIL	NIL	NIL	7	0.53
Widow/ widower	1	0.42	NIL	NIL	2	0.99	NIL	NIL	4	1.95	7	0.53
Total	238	100.00	502	100.00	202	100.00	166	100.00	205	100.00	1313	100.00

[A] 4.1.3 Literacy Status : About 49.43% respondents had education upto high school, followed by those who were educated upto graduate and above (15.31%). Maximum number of jail-inmates were illiterate (35.61%). There was no illiterate participant in P.A.C. personnel, however only 3.96% participants were illiterate in police personnel (Table 3). Highest number of respondents who were educated upto graduate and above level were in police (47.52%) and P.A.C. (33.74%) personnel. Least percentage of participants, educated upto graduate and above, were in truck drivers group (1.20%). Maximum number of illiterate subjects were truck drivers (21.31%).

[A] 4.1.4 Religion and caste : An overwhelming majority *i.e.* 83.40% were Hindus and only 15.69% of respondents were Muslims. Respondents from Christian and Sikh religion were 0.91% only (Table 4). About 47.00% of study subjects were of backward class and 29.68% were of general category. In police & P.A.C. personnel, there were nearly equal proportion of Hindus and Muslims. In all high risk groups least number of respondents were of SC/ST category (23.91%)

[A] 4.1.5 Socio-Economic Status : According to Table 5, there was no study subject in class I, very few were in class II (1.98%). Maximum percentage of respondents belonged to class V (67.86%), followed by Class IV (22.32%) and respondents of Class III (7.84%). Majority of respondents amongst police (52.48%) and P.A.C. (56.02%) personnel were in class IV, while in other groups, majority of participants were in class V truck drivers (89.44%), jail inmates (75.61%) and commercial sex workers (79.84%) followed by those from class IV.

Table : 3 Study subjects by literacy status

Literacy status	C.S. Ws		Truck Drivers		Police Personnel		P.A.C. Personnel		Jail inmates		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Illiterate	53	22.27	107	21.31	8	3.96	NIL	NIL	73	35.61	241	18.35
upto class 2nd (J.L.)	65	27.31	109	21.71	3	1.49	2	1.20	43	20.97	222	16.91
Class VI to XII (M.L.)	88	36.97	280	55.78	95	47.03	108	65.06	78	38.05	649	49.43
Graduate & Above	32	13.45	6	1.20	96	47.52	56	33.74	11	5.37	201	15.31
Total	238	100.00	502	100.00	202	100.00	166	100.00	205	100.00	1313	100.00

Table : 4 Study subjects by religion and caste

Religion/ Caste	C.S. Ws		Truck Drivers		Police Personnel		P.A.C. Personnel		Jail inmates		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Religion												
Hindu	190	79.83	385	76.69	179	88.61	153	92.17	188	91.71	1095	83.40
Muslim	44	18.49	109	21.72	23	11.39	13	17.83	17	8.29	206	15.69
Sikh/Christian	4	1.68	8	1.59	NIL	NIL	NIL	NIL	NIL	NIL	12	0.91
Total	238	100.00	502	100.00	202	100.00	166	100.00	205	100.100	1313	100.00
Caste												
General	62	26.05	149	29.68	77	38.12	58	34.94	36	17.56	382	29.09
OBC	109	45.80	261	51.99	77	38.12	62	37.35	108	52.68	617	47.00
SC/ST	67	28.15	92	18.33	48	23.76	46	27.71	61	29.76	314	23.91
Total	238	100.00	502	100.00	202	100.00	166	100.00	205	100.00	1313	100.00

Table : 5 Subjects by social class

Social Class	C.S. Ws		Truck Drivers		Police Personnel		P.A.C. Personnel		Jail inmates		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
I	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
II	10	4.20	NIL	NIL	4	1.98	7	4.22	5	2.44	26	1.98
III	14	5.88	23	4.58	38	18.81	23.00	13.86	5	2.44	103	7.84
IV	24	10.08	30	5.98	106	52.48	93	56.02	40	19.51	293	22.32
V	190	79.84	449	89.44	54	26.73	43	25.90	155	75.61	891	67.86
Total	238	100.00	502	100.00	202	100.00	166	100.00	205	100.00	1313	100.00

[A] 4.2 KNOWLEDGE ABOUT AIDS

This part of the study was designed to find out what the respondents knew and thought about AIDS. It was aimed to cover several aspects of AIDS, such as their knowledge on its curability, preventability, routes of transmission and its relation to some social factors.

[A] 4.2.1 Source of knowledge about HIV/AIDS : It is evident from table-6 that television (63.44%) was the main source of knowledge about HIV/AIDS followed by family members/friends (15.46%) and News papers (11.12). Majority of P.A.C. personnel (51.81%) got information about HIV/AIDS from newspapers while in other groups television was the main source. Least percentage of study subjects (9.98%) reported that books/magazines were main source of such knowledge for them.

[A] 4.2.2 Knowledge regarding general aspects of HIV / AIDS

[A] 4.2.2.1 Occurrence of HIV/AIDS in India : Majority of respondents (68.24%) were aware that HIV/AIDS occur in India (Table 7). Among police and P.A.C. personnel, level of knowledge was much higher (88.61% and 90.36% respectively) than other groups. Knowledge about occurrence of HIV/AIDS was lowest (42.85%) amongst C.S.Ws.

[A] 4.2.2.2 Availability of vaccine for HIV : Only 15.61% respondents said that there was vaccine available for prevention of HIV/AIDS while majority of respondents were aware for non-availability of vaccine.

[A] 4.2.2.3 Curability of AIDS : Table 7 shows that 27.11% study subjects were in favour of curability of AIDS. About one third CSWs (28.15%), 31.22% Jail-inmates and 28.09% truck drivers, wrongly knew that AIDS

Table : 6 Responses on source of knowledge about HIV/AIDS

Sources of Knowledge	C.S. Ws		Truck Drivers		Police Personnel		P.A.C. Personnel		Jail inmates		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
News Papers	20	8.4	13	2.59	21	10.4	86	51.81	6	2.93	146	11.12
Books/Magazines	11	4.62	77	15.34	14	6.93	17	10.24	12	5.85	131	9.98
Television	161	67.65	325	64.74	137	67.82	49	29.52	161	78.54	833	63.44
Family Mem. & Friends	46	19.33	87	17.33	30	14.85	14	8.43	26	12.68	203	15.46
Total	238	100.00	502	100.00	202	100.00	166	100.00	205	100.00	1313	100.00

Table : 7 Knowledge on general aspects of HIV/AIDS among respondents

Statements	C.S. Ws		Truck Drivers		Police Personnel		P.A.C. Personnel		Jail inmates		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Does AIDS Occur in India?	102	42.85	367	73.11	179	88.61	150	90.36	98	47.8	896	68.24
Is their any vaccine available for prevention of AIDS?	29	12.18	90	17.93	34	16.83	12	7.22	40	19.51	205	15.61
Is AIDS curable?	67	28.15	141	28.09	46	22.74	38	22.89	64	31.22	356	27.11
Is AIDS preventable?	80	33.61	231	46.02	176	87.31	126	75.90	71	34.63	684	52.09
Can condom be used for prevention of AIDS?	65	27.31	169	33.67	155	76.89	122	73.49	66	32.20	577	43.95

were curable, while percentage of respondents among police and P.A.C. personnel who reported that AIDS was curable, was slightly less than other groups (22.77% and 22.89% respectively).

[A] 4.2.2.4 Preventability of AIDS : According to table No. 7, 52.09% study subjects were aware of the fact that AIDS is preventable. Awareness was highest (87.31%) among police personnel, followed by P.A.C. personnel (75.90%). Only 34.63% jail-inmates were aware of the fact that AIDS was preventable. Percentage of respondents among truck drivers and CSWs who correctly stated that AIDS was preventable was 46.02% and 33.61% respectively.

[A] 4.2.2.5 Preventability of AIDS by use of condom :

About half of study subjects (43.95%) reported correctly that they could prevent transmission of HIV/AIDS by using condom (table 7), 34.63% jail-inmates, 33.67% truck drivers, 27.31% C.S.W.'s, 73.49% P.A.C. and 76.89% police personnel knew the fact. Awareness was highest in police personnel and least in C.S.W.s

[A] 4.2.3 Routes of transmission of AIDS : As evident from table 8, 73.27% respondents knew sexual route of AIDS transmission, while 18.21% and 50.19% participants knew that routes of transmission were blood and infected needles respectively. Vertical transmission was known to only 32.21% of respondents. Misconceptions regarding AIDS transmission viz. casual contact, sharing utensil, sneezing /coughing and mosquito - bites were present in 19.12%, 15.76%, 23.23% and 28.71% respondents respectively. Majority of truck drivers (69.72%), CSW's (63.86%), police personnel (93.07%), P.A.C. personnel (84.34%) and Jail-inmates (64.39%) reported sexual route for transmission of HIV/AIDS. Misconceptions regarding

modes of transmission were higher in truck drivers, CSWs and jail-inmates as compared to police & P.A.C. personnel.

[A] 4.2.4 AIDS - A public health problem : Table 9 shows that 49.58% respondents knew correctly that AIDS was a major public health problem now a days. Correct answers for this were given by 86.63%. Police personnels, 83.13% of P.A.C., 39.65% of truck drivers, 31.93% of S.T.D. Patients and 30.73% of jail-inmates. Only 22.01% respondents answered against this. One third (28.41%) of the study subjects reported that they did not know, whether HIV/AIDS was a public health problem or not.

[A] 4.3 ATTITUDE TOWARDS AIDS

[A] 4.3.1 Marriages in future and AIDS testing : According to table 10, 54.91% respondents felt that in future marriages, testing of HIV should be an important factor, where as, participants who stated against this (27.57%) were more than those who were undecided (17.52%). Maximum respondents (95.18%) who felt, testing to be necessary, were P.A.C. personnel followed by police (82.18%), truck drivers (47.21%), CSWs (34.87%) and jail-inmates (37.56%) while 37.82% CSW's, 30.68% truck drivers, 43.90% jail-inmates, 11.38% police and 3.01% P.A.C. personnel opined that there would not be any place of HIV testing before marriage.

[A] 4.3.2 Patients admission in the hospital and testing of HIV/AIDS : Table 11 shows that 50.96% respondents were in favour of such testing, while 15.38% were against this and 33.66% were undecided. Percentage of respondents who were in favour of such testing, was higher among P.A.C. (83.73%) and police personnel (80.20%) as compared to other groups.

Table : 8 Knowledge on routes of transmission

Routes of transmission	C.S. Ws		Truck Drivers		Police Personnel		P.A.C. Personnel		Jail inmates		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Casual contact	39	16.39	88	17.53	27	13.37	24	14.46	37	18.05	215	19.12
Sharing utensil	38	15.96	81	16.14	30	14.85	24	14.46	34	16.59	207	15.76
Sneezing/coughing	55	23.11	124	24.70	35	17.33	33	19.88	58	28.29	305	23.23
Mosquito bite	60	25.21	152	30.28	57	28.22	48	28.91	60	29.27	377	28.71
Multiple sexual partner	152	63.86	350	69.72	188	93.07	140	84.34	132	64.39	962	73.27
Infected needle	83	34.87	197	39.24	172	85.15	132	79.52	75	36.58	659	50.19
Blood transfusion	78	32.77	175	34.86	175	86.63	133	80.12	72	35.12	633	48.21
Mother to new borne	85	35.71	94	18.73	109	45.00	81	48.80	54	26.34	423	32.21

Table : 9 Responses to the question : whether HIV/AIDS is a public health problem?

Responses	C.S. Ws		Truck Drivers		Police Personnel		P.A.C. Personnel		Jail inmates		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Yes	76	31.93	199	39.65	175	86.63	138	83.13	63	30.73	651	49.58
No	58	24.37	179	35.65	9	4.46	25	15.06	18	8.78	289	22.01
Don't know	104	43.70	124	24.70	18	8.91	3	1.81	124	60.49	373	28.41
Total	238	100.00	502	100.00	202	100.00	166	100.00	205	100.00	1313	100.00

Table : 10 Responses to the question : Should investigation of HIV/AIDS be necessary before marriage?

Responses	C.S. Ws		Truck Drivers		Police Personnel		P.A.C. Personnel		Jail inmates		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Yes	83	34.87	237	47.21	166	82.18	158	95.18	77	37.56	721	54.91
No	90	37.82	154	30.68	23	11.38	5	3.01	90	43.9	362	27.57
Don't know	65	27.31	111	22.11	13	6.44	3	1.81	38	18.54	230	17.52
Total	238	100.00	502	100.00	202	100.00	166	100.00	205	100.00	1313	100.00

Table : 11 Responses to the question : Should every patient admitted in hospital be investigated for HIV?

Responses	C.S. Ws		Truck Drivers		Police Personnel		P.A.C. Personnel		Jail inmates		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Yes	83	34.87	207	41.24	162	80.2	139	83.73	78	38.05	669	50.96
No	26	10.93	110	21.91	26	12.87	20	12.05	20	9.76	202	15.38
Don't know	129	54.20	185	36.85	14	6.93	7	4.22	107	52.19	442	33.66
Total	238	100.00	502	100.00	202	100.00	166	100.00	205	100.00	1313	100.00

[A] 4.3.3 Foreign tourists and testing of HIV : Majority of respondents (53.40%) were in favour of HIV testing of every foreign tourist (table 12). Maximum respondents who were in favour of this fact, were P.A.C. (93.37%) and police (93.07%) personnel, followed by truck drivers (52.34%), CSW's (23.95) and jail-inmates (18.54%). About 1.42% police, 2.4% P.A.C. personnel, 9.76% Truck Drivers, 12.18% CSW's and 13.66% jail-inmates were against the idea of such testing.

[A] 4.3.4 Opinion about sex education in school children : As shown in table 13, 49.58% respondents were in favour of adding information on sexual behaviour in teaching curricula of schools. Maximum percentage of respondents who were in favour of such education, were in P.A.C. (86.75%) and police (82.18%), followed by 41.24%, truck drivers, 31.09% CSWs and 29.27% jail-inmates. Maximum participants, against this idea were from truck drivers (48.82%) and CSWs (23.11%) followed by jail-inmates (18.05%) police (16.34%) and P.A.C. personnel (11.45%). About twenty three percent respondents were undecided on this matter.

[A] 4.3.5 Separation of AIDS patient from family : Percentage of respondents who were in favour of separation was less (36.71%) than those who were against separation (46.00%). About 17.29% respondents were undecided on this matter (table 14). Nearly half (48.30%) of jail-inmates, 34.46% truck drivers, 37.82% CSW's, 33.13% P.A.C. and 32.18% police personnel opined that AIDS patients should be separated from family, while 64.46% P.A.C. personnel, 52.39% truckers, 49.01% police, 42.02% CSW's and only 17.07% jail-inmates were against separation of AIDS patients.

Table : 12 Responses to the question : Should every foreign tourist be investigated for HIV?

Responses	C.S. Ws		Truck Drivers		Police Personnel		P.A.C. Personnel		Jail inmates		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Yes	57	23.95	263	52.39	188	93.07	155	93.37	38	18.54	701	53.4
No	29	12.18	49	9.76	3	1.48	4	2.41	28	13.66	113	8.6
Don't know	152	63.87	190	37.85	11	5.45	7	4.22	139	67.80	499	38.00
Total	238	100.00	502	100.00	202	100.00	166	100.00	205	100.00	1313	100.00

Table : 13 Responses to the question : Should sex education be a lesson for school children?

Responses	C.S. Ws		Truck Drivers		Police Personnel		P.A.C. Personnel		Jail inmates		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Yes	74	31.09	207	41.24	166	82.18	144	86.75	60	29.27	651	49.58
No	55	23.11	220	43.82	33	16.34	19	11.45	37	18.05	364	27.72
Don't know	109	45.80	75	14.94	3	1.48	3	1.80	108	52.68	298	22.70
Total	238	100.00	502	100.00	202	100.00	166	100.00	205	100.00	1313	100.00

Table : 14 Responses to the question : Should AIDS patient be separated from family?

Responses	C.S. Ws		Truck Drivers		Police Personnel		P.A.C. Personnel		Jail inmates		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Yes	90	37.82	173	34.46	65	32.18	55	33.13	99	48.3	482	36.71
No	100	42.02	263	52.39	99	49.01	107	64.46	35	17.07	604	46
Don't know	48	20.16	66	13.15	38	18.81	4	2.41	71	34.63	227	17.29
Total	238	100.00	502	100.00	202	100.00	166	100.00	205	100.00	1313	100.00

[A] 4.3.6 Opinion regarding touching and care of AIDS patients : About thirty four percent respondents were of opinion that they should touch and care of AIDS patients, respondents against this view were 48.51% and 17.67% respondents were undecided. Correct opinion was highest among P.A.C. personnel (66.27%) followed by police (60.40%), only one-fourth (25.11%) truck drivers responded correctly. Highest percentage against this view were among truck drivers (60.76%) closely followed by Jail-inmates (60.00%) and 58.82% CSW's while only 19.88% P.A.C. personnel and 17.82% police were against this view (table 15).

[A] 4.3.7 Avoid sex with attractive stranger : According to table 16, 56.66% respondents were of the view that they should avoid sex with attractive stranger while 10.97% respondents were against this view and 32.37% were undecided. Majority of police (76.73%) & P.A.C. personnel (78.31%) were in favour of this statement. Only 51.71% jail inmates and 49.00% truck drivers stated that they should avoid sex with attractive stranger. Commercial sex workers (15.13%), 15.61% jail-inmates, 10.16% truck drivers, 8.42% police and 4.82% P.A.C. personnel opined that they would not avoid sex with attractive strangers as shown above, while percentage was least in P.A.C. personnel (4.82%).

[A] 4.3.8 Working of AIDS patient in factory or office : Table 17 shows that 64.58% respondents were of the view that AIDS patient could work in factory or office, while 19.04% participants were against it and 16.38% respondents were undecided. Correct opinion was given by 71.78% police and 65.66% P.A.C. personnel, followed by CSWs (65.13%) and truck drivers 63.35%. Only 59.02% Jail-inmates opined correctly. Percentage of respondents against this opinion was slightly higher in CSWs (21.01%), jail-inmates (20.49%) and truck drivers (20.12%) as compared to police (16.34%) and P.A.C. personnel (14.46%).

Table : 15 Responses to the question : Should a person touch and care an AIDS patient?

Responses	C.S. Ws		Truck Drivers		Police Personnel		P.A.C. Personnel		Jail inmates		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Yes	50	21.01	126	25.1	122	60.4	110	66.27	36	17.56	444	33.82
No	140	58.82	305	60.76	36	17.82	33	19.88	123	60	637	48.51
Don't know	48	20.17	71	14.14	44	21.78	23	13.85	46	22.44	232	17.67
Total	238	100.00	502	100.00	202	100.00	166	100.00	205	100.00	1313	100.00

Table : 16 Responses to the question : Should a person avoid sex with the attractive stranger?

Responses	C.S. Ws		Truck Drivers		Police Personnel		P.A.C. Personnel		Jail inmates		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Yes	107	44.95	246	49.00	155	76.73	130	78.31	106	51.71	744	56.66
No	36	15.13	51	10.16	17	8.42	8	4.82	32	15.61	144	10.97
Don't know	95	39.92	205	40.84	30	14.85	28	16.87	67	32.68	425	32.37
Total	238	100.00	502	100.00	202	100.00	166	100.00	205	100.00	1313	100.00

Table : 17 Responses to the question : Can AIDS patient work in factory / office ?

Responses	C.S. Ws		Truck Drivers		Police Personnel		P.A.C. Personnel		Jail inmates		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Yes	155	65.13	318	63.35	145	71.78	109	65.66	121	59.02	848	64.58
No	50	21.01	101	20.12	33	16.34	24	14.46	42	20.49	250	19.04
Don't know	33	13.86	83	16.53	24	11.88	33	19.88	42	20.49	215	16.38
Total	238	100.00	502	100.00	202	100.00	166	100.00	205	100.00	1313	100.00

[A] 4.3.9 Divorce of spouse who has AIDS : According to Table 18, 37.24% study subjects were in favoure of divorcing his/her spouse suffering from AIDS, whereas 22.24% respondents were undecided. Percentage of respondents who were in favour of such an idea were nearly equal in truck drivers (43.43%), and jail-inmates (43.42%) followed by CSWs (42.86%), least percentage was in P.A.C. (14.46%) followed by 27.10% police personnel. Maximum respondents were from P.A.C. (65.66%), who were against the idea of divorcing spouse who was suffering from AIDS followed by police police personnel (60.40%).

[A] 4.3.10 Opinion regarding feeling of ashame after having AIDS : Table 19, revealed that 58.42% respondents reported that if any person got infection of HIV, he/she should feel ashame, while about one third (26.96%) respondents were against such opinion and 14.62% were indifferent on this matter. Respondents who were against this view were maximum in P.A.C. (66.27%) followed by police (58.42%). These were minimum in truck drivers (13.55%) followed by jail-inmates (14.15%) and CSWs (12.18%). Respondents who were in favour of this statement were maximum in truck drivers (79.15%) followed by CSWs (60.92%) and jail-inmates (53.66%), while only about one third of police (31.18%) and P.A.C. personnel (31.33%) opined that person who is infected with HIV should feel ashame.

[A] 4.3.11 Marriage and child bearing of women with AIDS : Table 20 shows that about one-fourth (26.88%) of respondents mentioned that they will suggest a women with AIDS for marriage and child bearing while most of the P.A.C. personnel (86.75%) and police personnel (59.90%) were against this view. Overall percentage of respondents who were against this view was 43.72% and 29.40% participant were undecided. This table also shows that only 8.91% police and 9.64% P.A.C. personnel favoured

Table : 18 Responses to the question : Should a person divorce his/her spouse who has AIDS?

Responses	C.S. Ws		Truck Drivers		Police Personnel		P.A.C. Personnel		Jail inmates		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Yes	102	42.86	218	43.43	56	27.72	24	14.46	89	43.42	489	37.24
No	62	26.05	145	28.88	122	60.4	109	65.66	94	45.85	532	40.52
Don't know	74	31.09	139	27.69	24	11.88	33	19.88	22	10.73	292	22.24
Total	238	100.00	502	100.00	202	100.00	166	100.00	205	100.00	1313	100.00

Table : 19 Responses to the question : Should a person feel ashamed if he/she has AIDS?

Responses	C.S. Ws		Truck Drivers		Police Personnel		P.A.C. Personnel		Jail inmates		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Yes	145	60.92	397	79.08	63	31.18	52	31.33	110	53.66	767	58.42
No	29	12.18	68	13.55	118	58.42	110	66.27	29	14.15	354	26.96
Don't know	64	26.90	37	7.37	21	10.40	4	2.40	66	32.19	192	14.62
Total	238	100.00	502	100.00	202	100.00	166	100.00	205	100.00	1313	100.00

Table : 20 Responses to the question : Would you suggest a woman with AIDS for marriage and child bearing?

Responses	C.S. Ws		Truck Drivers		Police Personnel		P.A.C. Personnel		Jail inmates		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Yes	62	26.05	197	39.24	18	8.91	16	9.64	60	29.27	353	26.88
No	119	50.00	81	16.14	121	59.9	144	86.75	109	53.17	574	43.72
Don't know	57	23.95	224	44.62	63	31.19	6	3.61	36	17.56	386	29.40
Total	238	100.00	502	100.00	202	100.00	166	100.00	205	100.00	1313	100.00

of marriages and child bearing of woman having AIDS but percentage was higher among truck drivers (39.24%), Jail-inmates (29.27%) and CSWs (26.05%).

[A] 4.4 HIGH RISK PRACTICES

[A] 4.4.1 Age at first sexual intercourse : According to table No. 21, 44.93% respondents had their first sexual contact between 15-19 years of age and 32.44% had it between 20-24 years while 6.02% never experienced it before. About 47 percent (46.04%) police and 53.01% P.A.C. personnel had their first sexual contact between 20 to 24 years whereas 52.19% jail-inmates and 76.89% CSWs had it between 15-19 years.

[A] 4.4.2 Sex with partner other than spouse : Table 22a shows that about one - third (35.40%) married respondents reported that they have experienced sex with partners other than their spouses. Such percentage was highest among CSWs (100%) and lowest among P.A.C. personnel (19.48%). Among respondents who admitted having sex with partners other than spouses, 17.82% reported having had sex with only one partner other than spouse while 82.18% had more than one partner (table 22b). Maximum respondents having multiple sexual partners were from CSWs (100%), followed by Truck drivers (82.24%) and by jail inmates (76.32%). Table 22(c) shows that about 79.10% unmarried respondents reported to have sex relations with others, such percentage was highest among CSWs (100%). Percentage was found to be almost similar in rest of the respondents, truck drivers (68.80%), police and PAC personnel (66.67%) and jail inmates (66.29%).

Table : 21 Study subjects by age at first sexual intercourse

Age Groups (Years)	C.S. Ws		Truck Drivers		Police Personnel		P.A.C. Personnel		Jail inmates		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
14-Oct	28	11.76	57	11.35	7	3.46	4	2.41	12	5.85	108	8.23
15-19	183	76.89	166	33.08	80	39.6	54	32.53	107	52.19	590	44.93
20-24	18	7.57	183	36.45	93	46.04	88	53.01	44	21.47	426	32.44
25-30	9	3.78	57	11.35	16	7.93	16	9.64	12	5.86	110	8.38
Never	0	0.00	39	7.77	6	2.97	4	2.41	30	14.63	79	6.02
Total	238	100.00	502	100.00	202	100.00	166	100.00	205	100.00	1313	100.00

Table : 22 (a) Study subjects who ever had sex with a partner other than spouse

Responses	C.S. Ws		Truck Drivers		Police Personnel		P.A.C. Personnel		Jail inmates		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Yes	104	100.00	107	28.38	52	28.26	30	19.48	38	32.76	331	35.40
No	0	0.00	270	71.62	132	71.74	124	80.52	78	67.24	604	64.60
Total	104	100.00	377	100.00	184	100.00	154	100.00	116	100.00	935	100.00

Table : 22 (b) Study subjects who ever had sex with other partner by their number of sexual partners other than spouse

Responses	C.S. Ws		Truck Drivers		Police Personnel		P.A.C. Personnel		Jail inmates		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
One	0	0.00	19	17.76	17	32.69	14	46.67	9	23.68	59	17.82
More than one	104	100.00	88	82.24	35	67.31	16	53.33	29	76.32	272	82.18
Total	104	100.00	107	100.00	52	100.00	30	100.00	38	100.00	331	100.00

Table : 22 (c) Study subjects of unmarried who had sexual relations

Responses	C.S. Ws		Truck Drivers		Police Personnel		P.A.C. Personnel		Jail inmates		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Unmarried but Having relation	134	100.00	86	68.80	12	66.67	8	66.67	59	66.29	299	79.10
Unmarried having no relations	0	0.00	39	31.20	6	33.33	4	33.33	30	33.71	79	20.90
Total	134	100.00	125	100.00	18	100.00	12	100.00	89	100.00	378	100.00

Table : 22 (d) Study subjects who are unmarried but having sexual relations by their number of sexual partners

Responses	C.S. Ws		Truck Drivers		Police Personnel		P.A.C. Personnel		Jail inmates		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
One	Nil	0.00	33	38.37	8	66.67	5	62.5	46	77.97	92	30.77
More than one	134	100.00	53	61.63	4	33.33	3	37.5	13	22.03	207	69.23
Total	134	100.00	86	100.00	12	100.00	8	100.00	59	100.00	299	100.00

[A] 4.4.3 Study subjects by their types of sexual partners :

According to table 23, amongst married respondents, who had sex with partners other than their spouses and unmarried respondents who had sexual relations with other majority had done it with their friends. Percentage of respondents who had sex with commercial sex workers was highest among truck drivers (26.47%), followed by jail inmates (14.45%), P.A.C. (3.5%) and police personnel (1.0%). The respondents who reported having sex with their relatives were maximum in CSWs (21.43%), followed by Jailinmates (19.27%). Percentage of respondents who had sex with call girls was highest among truck drivers (23.53%), followed by jail inmates (16.26%), and the same practice was found in case of sex with neighbours and Beggers.

[A] 4.4.4 Oral sex : Practice of oral sex was reported by (9.44%) respondents, whereas, 90.56% had never tried it (Table 24). Most of the police (95.54) and P.A.C. personnel (94.58%) had never experienced it. Percentage of respondents who experienced it was more in CSW's (13.87%), truck drivers (11.55%) and jail-inmates (7.32%) as compared to P.A.C. (5.42%) and police personnel (4.46%).

[A] 4.4.5 Anal sex : Anal sex was tried by 16.15% of study subjects, 29.83% CSWs, 20.49% jail-inmates and 14.54% truck drivers experienced it, whereas only 6.93% police and 7.23% P.A.C. personnel tried it (Table 25). Majority of respondents (83.85%) never tried it, percentage was slightly higher among police (93.07%) and P.A.C. personnel (92.77%) as compared to other high risk groups.

Table : 23 * Study subjects by type of their sexual partners other than spouse

Sexual partners	Truck Drivers		Police Personnel		P.A.C. Personnel		Jail inmates	
	%	No.	%	No.	%	No.	%	No.
CSW	-	63	26.47	5	1	7	3.5	24
Relatives	23.41	51	21.43	8	1.6	7	3.5	32
Friends	87.80	38	15.96	7	1.4	10	4.9	41
Neighbours	96.09	33	13.86	3	0.6	1	0.49	12
Callgirls	-	56	23.53	4	0.7	2	1	27
Beggars	-	22	9.24	1	0.2	1	0.5	6
								3.61

* Analysis is based on multiple responses

Table : 24 Respondents by practice of oral sex

Ever had oral sex	C.S. Ws		Truck Drivers		Police Personnel		P.A.C. Personnel		Jail inmates		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Yes	33	13.87	58	11.55	9	4.46	9	5.42	15	7.32	124	9.44
No	205	86.13	444	88.45	193	95.54	157	94.58	190	92.68	1189	90.56
Total	238	100.00	502	100.00	202	100.00	166	100.00	205	100.00	1313	100.00

Table : 25 Respondents by experience of anal sex

Ever had anal sex	C.S. Ws		Truck Drivers		Police Personnel		P.A.C. Personnel		Jail inmates		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Yes	71	29.83	73	14.54	14	6.93	12	7.23	42	20.49	212	16.15
No	167	70.17	429	85.46	188	93.07	154	92.77	163	79.51	1101	83.85
Total	238	100.00	502	100.00	202	100.00	166	100.00	205	100.00	1313	100.00

[A] 4.4.6 Spouse having any other sexual partner : Majority of respondents (56.68%) reported that they did not know that either of their spouses had any other sexual partner (Table 26a), 23.64% denied it and only 19.68% admitted that their spouse had one or more sexual partner other than them. Percentage of respondents who admitted it was higher in CSWs (70.19%) followed by jail-inmates (18.10%) but lower in P.A.C. personnel (8.44%) and truck drivers (11.94%).

Among the respondents who admitted that their spouses had other sexual partners, 70.11% stated that their spouses had multiple sexual partners and only 29.89% stated about one such sexual partner only. Majority of spouses of CSW's (82.19%), prisoners (76.19%) had multiple sexual partners, percentage was lowest (table 26b) among police personnel (43.75%).

[A] 4.4.7 Use of condom during sex : Respondents who never used condom (54.05%) were almost equal of those who used it some times (42.14%). While only (3.81%) respondents reported that they always used condom during sex. Majority of CSWs (68.91%), truckers (65.87%) and prisoners (65.71%) never used its whereas percentage of respondents among police (21.94%) and P.A.C. personnel (24.69%) who never used condom during sex was comparatively low (table 27).

[A] 4.4.8 Need for injectables : Majority of respondents (81.57%) reported that they needed injectables, while only 16.69% denied it (Table 28). The proportion of respondents who have used injectables was higher in police (90.10%) and P.A.C. personnel (87.95%) as than CSWs (81.09%), Jail-inmates (83.90%) and truck drivers (75.30%).

Table : 26 (a) Respondents by their spouse having any other sexual partner

Responses	C.S. Ws		Truck Drivers		Police Personnel		P.A.C. Personnel		Jail inmates		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Yes	73	70.19	45	11.94	32	17.39	13	8.44	21	18.1	184	19.68
No	21	20.19	67	17.77	59	32.07	50	32.47	24	20.69	221	23.64
Don't know	10	9.62	265	70.29	93	50.54	91	59.09	71	61.21	530	56.68
Total	104	100.00	377	100.00	184	100.00	154	100.00	116	100.00	935	100.00

Table : 26 (b) If yes no of sexual partners their spouses had

Responses	C.S. Ws		Truck Drivers		Police Personnel		P.A.C. Personnel		Jail inmates		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
One only	13	17.81	16	35.56	18	56.25	3	23.08	5	23.81	55	29.89
1 +	60	82.19	29	64.44	14	43.75	10	76.92	16	76.19	129	70.11
Total	73	100.00	45	100.00	32	100.00	13	100.00	21	100.00	184	100.00

Table : 27 Respondents by use of condom during sex

Responses	C.S. Ws		Truck Drivers		Police Personnel		P.A.C. Personnel		Jail inmates		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Always	3	1.26	10	2.16	16	8.16	12	7.41	6	3.43	47	3.81
Sometimes	71	29.83	148	31.97	137	69.9	110	67.90	54	30.86	520	42.14
Never	164	68.91	305	65.87	43	21.94	40	24.69	115	65.71	667	54.05
Total	238	100.00	463	100.00	196	100.00	162	100.00	175	100.00	1234	100.00

Table : 28 Respondents by need of injectables

Responses	C.S. Ws		Truck Drivers		Police Personnel		P.A.C. Personnel		Jail inmates		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Yes	193	81.09	378	75.30	182	90.10	146	87.95	172	83.90	1071	81.57
No	45	18.91	124	24.70	20	9.90	20	12.05	33	16.10	242	18.43
Total	238	100.00	502	100.00	202	100.00	166	100.00	205	100.00	1313	100.00

[A] 4.4.9 Use of disposable needles & syringes : Among those respondents who had used injectables (56.96%) never use disposable needles and syringes. A section however, (18.76%) was not sure whether they used disposable needles and syringes or not. Only 24.28% study subjects reported that they always used it (table 29). Maximum respondents who used it were P.A.C. personnel (46.58%) followed by police (43.96%) and minimum were truck drivers (13.49%) and CSWs (11.92%).

[A] 4.4.10 Blood transfusion : According to table 30, only (3.43%) respondents got blood transfused, while 96.57% reported no transfusion at all. Percentage was nearly equal in all high risk groups, 66.67% CSWs, 70% jail-inmates, 66.67% P.A.C. personnel, 60% truck drivers and 33.33% police personnel who needed blood transfusion, got it from their relatives. Only 2.22% police personnel received blood from voluntary donor and one respondents from P.A.C. and police personnel got blood from professional donor (table 31). Nearly One-third (31.12%) respondents were unable to give information about donors.

[A] 4.4.11 Respondents by donation of blood : Table 32, shows that (9.22%) study subjects donated their blood. Of these 72.73% respondents donated their blood only once, 18.18% donated two times and 9.09% donated many times. Majority of them donated blood to their relatives (86.78%) and 13.22% were professional donors. Proportion of professional donors amongst prisoner donors was 35%, among truckers 15.79% and CSWs was 13.64%, while there was none among Police and P.A.C. personnel.

Table : 29 Respondents by use of disposable needles & syringes

Responses	C.S. Ws		Truck Drivers		Police Personnel		P.A.C. Personnel		Jail inmates		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Yes	23	11.92	51	13.49	80	43.96	68	46.58	38	22.09	260	24.28
No	125	64.76	216	57.14	93	51.10	71	48.63	105	61.05	610	56.96
Not sure	45	23.32	111	29.37	9	4.94	7	4.79	29	16.86	201	18.76
Total	193	100.00	378	100.00	182	100.00	146	100.00	172	100.00	1071	100.00

Table : 30 Respondents by transfusion of blood

Responses	C.S. Ws		Truck Drivers		Police Personnel		P.A.C. Personnel		Jail inmates		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Yes	9	3.78	11	2.19	9	4.46	6	3.61	10	4.88	45	3.43
No	229	96.22	491	97.81	193	95.54	160	96.39	195	95.12	1268	96.57
Total	238	100.00	502	100.00	202	100.00	166	100.00	205	100.00	1313	100.00

Table : 31 Respondents by source of blood

Responses	C.S. Ws		Truck Drivers		Police Personnel		P.A.C. Personnel		Jail inmates		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Relative	6	66.67	7	60.00	3	33.33	4	66.67	7	70.00	27	60.00
Vol. Donar	0	0.00	0	0.00	2	22.22	0	0.00	0	0.00	2	4.44
Prof. Donar	0	0.00	0	0.00	1	11.11	1	16.66	0	0.00	2	4.44
Don't know	3	33.33	4	40.00	3	33.34	1	16.67	3	30.00	14	31.12
Total	9	100.00	11	100.00	9	100.00	6	100.00	10	100.00	45	100.00

Table : 32 (a) Respondents by donation of blood

Responses	C.S. Ws		Truck Drivers		Police Personnel		P.A.C. Personnel		Jail inmates		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Yes	22	9.24	38	7.57	23	11.39	18	10.84	20	9.76	121	9.22
No	216	90.76	464	92.43	179	88.61	148	89.16	185	90.24	1192	90.78
Total	238	100.00	502	100.00	202	100.00	166	100.00	205	100.00	1313	100.00

Talbe : 32 (b) Respondents by donation of blood by no. of times

Responses	C.S. Ws		Truck Drivers		Police Personnel		P.A.C. Personnel		Jail inmates		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
One	15	68.18	25	65.79	20	86.96	16	88.89	12	60.00	88	72.73
Two	7	31.82	6	15.79	3	13.04	2	11.11	4	20.00	22	18.18
Many	0	0.00	7	18.42	0	0.00	0	0.00	4	20.00	11	9.09
Total	22	100.00	38	100.00	23	100.00	18	100.00	20	100.00	121	100.00

Table : 32 (c) Respondents by reasons of donation of blood

Responses	C.S. Ws		Truck Drivers		Police Personnel		P.A.C. Personnel		Jail inmates		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Relative	19	86.36	32	84.21	23	100.00	18	100	13	65.00	105	13.22
To earn money	3	13.64	6	15.79	0	0.00	0	0.00	7	35.00	16	86.78
Total	22	100.00	38	100.00	23	100.00	18	100.00	20	100.00	121	100.00

[A] **4.4.12 Intravenous drug users** : Majority of respondents (99.31%) reported that they have never taken any intoxicated injection, only 0.69% accepted this kind of intoxication (Table 33). Maximum intravenous drug users were prisoners (2.93%) followed by P.A.C. personnel (1.81%) while there was no intravenous drug user amongst truckers, CSWs and police personnel.

[A] **4.5 PREVALENCE OF HIV AMONG HIGH RISK GROUPS**

The prevalence rates of HIV amongst high risk groups are depicted in Table 34. Overall prevalence rate of HIV, observed in the present study was 2.51%. It was highest among CSWs (4.20%) followed by truck drivers (4.18%) and jail-inmates (0.98%). No participant was detected positive for HIV amongst police and P.A.C. personnel.

[A] **4.5.1 Prevalence rate (%) of HIV amongst high risk groups by age :**

The age-wise prevalence for different high risk groups are presented in Table 35. Positivity of HIV was higher (2.91%) in the age group of 18-25 years followed by above 25 years of age group (2.46%). But such difference was statistically insignificant ($t_{\text{calculated}}=0.010$, $t < t_{0.10}$, $\alpha=1.282$). There was no participant detected positive from the age group of 55 years and above.

[A] **4.5.2 Prevalence rate (%) of HIV amongst high risk groups by marital status** : According to Table 36, most of the study subjects who were tested positive for HIV were unmarried 3.46% and 2.16% were married and result was statistically insignificant ($t_{\text{calculated}}=.043 < t_{0.10}$, $\alpha=1.282$).

Table : 33 Respondents by use of intoxicated injection

Responses	C.S. Ws		Truck Drivers		Police Personnel		P.A.C. Personnel		Jail inmates		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Yes	0	0.00	0	0.00	0	0.00	3	1.81	6	2.93	9	0.69
No	238	100.00	502	100.00	202	100.00	163	98.19	199	97.07	1304	99.31
Total	238	100.00	502	100.00	202	100.00	166	100.00	205	100.00	1313	100.00

Table : 34 Prevalence rate (%) of HIV amongst high risk group studied

High Risk Groups	No. Studied				Positive for HIV				Prevalence Rate (%)
	M	F	Total	(%)	M	F	Total	(%)	
1) C S W s	00	238	238	18.13	00	10	10	30.30	4.20
2) Truck Drivers	502	00	502	38.23	21	00	21	63.64	4.18
3) Police Personnels	190	12	202	15.39	00	00	00	00.00	00.00
4) PAC Personnels	166	00	166	12.64	00	00	00	00.00	00.00
5) Jail Inmates	198	07	205	15.61	02	00	02	06.06	0.98
Total	1,056	257	1313	100.00	23	10	33	100.00	2.51

Statistical Significance : $t_{0.10; \alpha} = 1.282$ (Table Value), $t = .0126$ (calculated value) $t < t_{0.10; \alpha}$ (insignificant)

Table : 35 Prevalence rate (%) of HIV amongst high risk groups by Age

Age groups (Years)	No. Studied							Positive for HIV							Preva- lence Rate (%)
	CSWs	Truck D	Police P	PAC P	Jail inmates	Total	%	CSWs	Truck D	Police P	PAC P	Jail inmates	Total	%	
18 - 25	119	121	19	29	90	378	28.79	06	05	00	00	00	11	33.33	2.91
26 - 54	110	358	179	135	111	893	68.01	04	16	00	00	02	22	66.67	2.46
> 55	09	23	04	02	04	42	3.20	00	00	00	00	00	00	00	00
TOTAL	238	502	202	166	205	1313	00.00	10	21	00	00	02	33	100.00	2.51

Statistical Significance : $t_{0.10; \alpha} = 1.282$ (Table value), $t = .010$ (Calculated value) $t < t_{0.10; \alpha}$ (insignificant)

Table : 36 Prevalence rate (%) of HIV amongst high risk group by marital status

Marital Status	No. Studied							Positive for HIV							Prevalence Rate (%)
	CSWs	Truck D	Police P	PAC P	Jail inmates	Total	%	CSWs	Truck Drivers	Police Personal	PAC P	Jail inmates	Total	%	
Unmarried	190	125	18	12	89	434	33.06	8	06	00	00	01	15	45.45	3.46
Married	10	375	182	154	112	833	63.44	2	15	00	00	01	18	54.55	2.16
Divorce	33	02	00	00	00	035	2.67	00	00	00	00	00	00	00.00	0.00
widow/ widower	05	00	02	00	04	011	0.84	00	00	00	00	00	00	00.00	0.00
Total	238	502	202	166	205	1313	100.00	10	21	00	00	02	33	100.00	2.51

Statistical Significance : $t_{0.10; \alpha} = 1.282$ (Table value), $t = .043$ (calculated value) $t_{<to. 10; \alpha}$ (insignificant)

[A] 4.5.3 Prevalence rate (%) of HIV amongst high risk groups by literacy status : Literacy status wise prevalence rate (%) are depicted in table 37. Prevalence rate was highest among just literates (5.41%) , followed by participants who were moderately literate (3.08%) and illiterate (0.41%). While it was zero in well literate groups. Analysis showed that positivity was significantly higher ($t_{\text{(calculated)}}=3.25 > t_{0.05, \alpha}=2.576$), among Just literates than in respondents who were moderately literate.

[A] 4.5.4 Religion and caste specific prevalence rate :

Prevalence rate (%) of HIV amongst high risk groups by religion and caste are depicted in tables 38 and 39 respectively. Prevalence was higher among Hindus 2.65% than in muslims (1.94%) but result was statistically insignificant ($t_{\text{(calculated)}}=.595 < t_{0.10, \alpha}=1.282$). Caste wise analysis of data showed that maximum percentage was of SC/ST (4.46%), followed by OBC category (2.11%) and General (1.57%). These differences were statistically insignificant ($t_{\text{(calculated)}}=.607 < t_{0.10, \alpha}=1.283$).

[A] 4.5.5 Socio-economic status specific prevalence rate :

Socio-economic status wise prevalence of HIV amongst high risk groups are depicted in table 40. Maximum positive cases were in lower class (2.62%) followed by middle class (1.55%). No participant was positive for HIV amongst upper social classes.

[A] 4.5.6 Prevalence rate of HIV amongst high risk groups by use of condom : Prevalence of HIV was higher (3.63%) among respondents who never used condom during sexual inter-course and the difference was statistically highly significant ($t_{\text{(calculated)}}=2.910 < t_{0.05, \alpha}=2.576$). There was no positive case of HIV among those respondents who reported that, they always used condom during sex (table 41).

Table : 37 Prevalence rate (%) of HIV Amongst high risk group by literacy status

Literacy Status															Prevalence Rate (%)
	CSWs	Truck D	Police P	PAC P	Jail inmates	Total	%	CSWs	Truck D	Police P	PAC P	Jail inmates	Total	%	
Illiterate	53	107	08	00	73	24	18.35	01	00	00	00	00	01	3.03	0.41
up to class V (just Lit.)	65	109	03	02	43	222	16.91	07	03	00	00	02	12	36.36	5.41
Class VI to XII (Modet. Lit)	88	280	95	108	78	649	49.43	02	18	00	00	00	20	60.61	03.08
Graduate & Above	32	06	96	56	11	201	15.31	00	00	00	00	00	00	00.00	00.00
Total	238	502	202	166	205	1313	100.00	10	21	00	00	02	33	100.00	02.51

Statistical Significance : $t_{.005; \alpha} = 2.576$ (Table Value), $t = 3.025$ (calculated value) $t > t_{.005; \alpha}$ (Highly significant)

Table : 38 Prevalence rate (%) of HIV amongst high risk group by religion

Religion	No. Studied							Positive for HIV							Prevalence Rate (%)
	CSWs	Truck Drivers	Police P	PAC P	Jail inmates	Total	%	CSWs	Truck Drivers	Police P	PAC P	Jail inmates	Total	%	
Hindu	190	385	179	153	188	1095	83.40	09	018	00	00	02	29	87.88	2.65
Muslim	044	109	23	13	17	206	15.69	01	03	00	00	00	04	12.12	1.94
Sikh/Christian	04	8	00	00	00	12	0.91	00	00	00	00	00	00	00.00	0.00
TOTAL	238	502	202	166	205	1313	100.00	10	21	00	00	02	33	100.00	2.51

Statistical Significance : $t_{0.10; \alpha} = 1.282$ (Table Value), $t = .595$ (Calculated value) $t < t_{0.10; \alpha}$ (insignificant)

Table : 39 Prevalence rate (%) of HIV amongst high risk group by caste

Caste	No. Studied							Positive for HIV							Preva- lence Rate (%)
	CSWs	Truck D	Police P	PAC P	Jail inmates	Total	%	CSWs	Truck D	Police P	PAC P	Jail inmates	Total	%	
General	62	149	77	58	36	382	29.09	01	04	00	00	01	06	18.18	1.57
OBC	109	261	77	62	108	617	47.00	04	08	00	00	01	13	39.40	2.11
SC/ST	67	92	48	46	61	314	23.91	05	09	00	00	00	14	42.42	4.46
TOTAL	238	502	202	166	205	1313	100.00	10	21	00	00	02	33	100.00	2.51

Statistical Significance : $t_{0.10; \alpha} = 1.282$ (Table Value), $t = .607$ (Calculated value) $t < t_{0.10; \alpha}$ (insignificant)

Table : 40 Prevalence rate (%) of HIV amongst high risk group by social class

Social Class	No. Studied							Positive for HIV							Prevalence Rate (%)
	CSWs	Truck D	Police P	PAC P	Jail inmates	Total	%	CSWs	Truck D	Police P	PAC P	Jail inmates	Total	%	
Upper Class	00	00	00	00	00	00	00.00	00	00	00	00	00	00	00.00	00
Middle Class	24	23	42	30	10	129	9.82	00	02	00	00	00	02	6.06	1.55
Lower Class	214	479	160	136	195	1184	90.18	10	19	00	00	02	31	93.94	2.62
TOTAL	238	502	202	166	205	1313	100.00	10	21	00	00	02	33	100.00	2.51

Statistical Significance : $t_{0.10; \alpha} = 1.282$ (Table Value), $t = .048$ (Calculated value) $t < t_{0.10; \alpha}$ (insignificant)

Table : 41 Prevalence rate (%) of HIV amongst high risk groups by use of condom

Use of Condom	No. Studied							Positive for HIV							Prevalence Rate (%)
	CSWs	Truck D	Police P	PAC P	Jail inmates	Total	%	CSWs	Truck D	Police P	PAC P	Jail inmates	Total	%	
Always	03	11	14	12	7	47	3,58	00	00	00	00	00	00.00	00.00	
Sometimes	71	160	142	113	64	550	41.89	01	05	00	00	01	07	21.21	1.27
Never	164	331	46	41	134	716	54.53	09	16	00	00	01	26	78.79	3.63
TOTAL	238	502	202	166	205	1313	100.00	10	21	00	00	02	33	100.00	2.51

Statistical Significance : $t_{.005; \alpha} = 2.576$ (Table Value), $t = 2.91$ (Calculated value) $t > t_{.005; \alpha}$ (Highly significant)

[A] 4.5.7 Prevalence rate of HIV amongst high risk groups by sex with partner other than their spouse : Such responses of the subjects and their analysis are shown in table 42. The percentage of HIV positivity amongst respondents, who had sex with partners other than their spouses was relatively very high (4.23%) as compared to respondents who had no such partners (0.50%). Analysis showed that such result was statistically highly significant ($t_{\text{(calculated)}}=4.09 > t_{.005, \alpha}=2.576$). In the same way prevalence rate of HIV among unmarried (table 43) respondents who had sex with others was very high (5.35%). Prevalence rate is zero in those who had no such relations. Analysis showed that such result was statistically highly significant ($t_{\text{(calculated)}}=2.08 > t_{.025, \alpha}=1.960$).

[A] 4.5.8 Prevalence rate of HIV by number of sex partners : Prevalence rate was higher (5.80%) amongst the respondents who reported that they had sex with more than one partners, other than their spouses, as compared to those who had sex with one partner only besides own spouse (table 44). But the result was statistically insignificant ($t_{\text{(calculated)}}=.227 < t_{0.10, \alpha}=1.282$).

[A] 4.5.9 Prevalence rate of HIV amongst high risk groups by type of sexual partners: The association of HIV positivity of respondents by type of their sexual partners are depicted in table 45. Prevalence of HIV positivity was much higher amongst participants who had sexual intercourse with commercial sex workers (11.11%) and with call girls (7.87%) than those who had sex with others. This association was statistically slightly significant ($t_{\text{(calculated)}}=.755 < t_{0.10, \alpha}=1.282$).

Table : 42 Prevalence rate (%) of HIV amongst high risk group by sex partners other than spouse

Had Sex With	No. Studied							Positive for HIV							Prevalence Rate (%)
	CSWs	Truck D	Police P	PAC P	Jail inmates	Total	%	CSWs	Truck D	Police P	PAC P	Jail inmates	Total	%	
other	104	107	52	30	38	331	35.40	01	12	00	00	01	14	82.35	4.23
Spouse	00	270	132	124	78	604	64.60	00	03	00	00	00	03	17.65	0.50
TOTAL	104	377	184	154	116	935	100.00	01	15	00	00	01	17	100.00	1.82

Statistical Significance : $t_{.005; \alpha} = 2.576$ (Table Value), $t = 4.09$ (Calculated value) $t > t_{.005; \alpha}$ (Highly significant)

Table : 43 Prevalence rate (%) of HIV amongst high risk groups who were unmarried

Had Sex With	No. Studied							Positive for HIV							Prevalence Rate (%)
	CSWs	Truck D	Police P	PAC P	Jail inmates	Total	%	CSWs	Truck D	Police P	PAC P	Jail inmates	Total	%	
Un married but having relations	134	86	12	08	59	299	79.10	09	06	00	00	01	16	100.00	5.35
having No relations	00	39	06	04	30	79	20.90	00	00	00	00	00	00	00	00.00
TOTAL	134	125	18	12	89	378	100.00	09	06	00	00	01	16	100.00	4.23

Statistical Significance : $t_{.025, \alpha} = 1.960$ (Table Value), $t = 2.08$ (Calculated value) $t > t_{.025, \alpha}$ (Significant)

Table : 44 Prevalence rate (%) of HIV amongst high risk groups by number of sex partners

Responses	No. Studied							Positive for HIV							Preva- lence Rate (%)
	CSWs	Truck D	Police P	PAC P	Jail inmates	Total	%	CSWs	Truck D	Police P	PAC P	Jail inmates	Total	%	
One	00	52	25	19	55	151	28.49	00	07	00	00	01	08	26.67	5.30
More than one	138	141	39	19	42	379	71.51	10	11	00	00	01	22	73.33	5.80
TOTAL	138	193	64	38	97	530	100.00	10	18	00	00	02	30	100.00	5.66

Statistical Significance : $t_{0.10; \alpha} = 1.282$ (Table Value), $t = .227$ (Calculated value) $t < t_{0.10; \alpha}$ (insignificant)

Table : 45 Prevalence rate (%) of HIV amongst high risk groups by types of sexual partners

Type of Sexual Partners	No. Studied							Positive for HIV							Prevalence Rate (%)
	CSWs	Truck D	Police P	PAC P	Jail inmates	Total	%	CSWs	Truck D	Police P	PAC P	Jail inmates	Total	%	
C.S.W.S.	-	63	05	07	24	99	7.54	-	09	00	00	02	11	33.33	11.11
Relatives	48	51	08	07	32	146	11.12	00	00	00	00	02	02	6.06	1.37
Friends	180	38	07	10	41	276	21.02	09	02	00	00	02	13	39.39	4.71
Neighbours	93	33	03	01	12	142	10.81	01	02	00	00	00	03	9.09	2.11
Call Girls	-	56	04	02	27	89	6.78	-	07	00	00	02	07	21.21	7.87
Beggars	-	22	01	01	06	30	2.28	-	01	00	00	00	01	3.03	3.33

* (Analysis Bases on multiple responses)

Statistical Significance : $t_{0.10; \alpha} = 1.282$ (Table Value), $t = .755$ (Calculated value) $t < t_{0.10; \alpha}$ (slightly insignificant)

[A] 4.5.10 Prevalence rate of HIV amongst high risk groups practising oral sex : According to table 46, 3.23% participants were positive for HIV amongst those who admitted having oral sex. Only 2.44% detected to be positive who denied such kind of activity, but result was not significant ($t_{\text{(calculated)}}=.5374 < t_{0.10}, \alpha=1.282$). This analysis showed that there was no association between prevalence of HIV infection and practice of oral sex.

[A] 4.5.11 Prevalence rate of HIV amongst high risk groups practising anal sex : There are clear evidences that anal sex has more risk of transmission of HIV. According to table 47, amongst those study subjects who admitted that they had experienced anal sex, HIV positivity was higher (4.25%), while percentage was relatively lower amongst those who denied such type of sexual activity and the result was statistically significant ($t_{\text{(calculated)}}=1.231 < t_{0.10}, \alpha=1.282$).

[A] 4.5.12 Prevalence rate of HIV amongst blood transfusion recipients : According to table 48 prevalence rate of HIV is high amongst those who had undergone blood transfusion (6.67%), while only (2.37%) study subjects were detected to be positive, amongst those who denied blood transfusion. The result was statistically significant ($t_{\text{(calculated)}}=1.816 > t_{0.10}, \alpha=1.282$).

[A] 4.5.13 Prevalence rate of HIV amongst high risk groups by donation of blood : Prevalence rates (%) amongst blood donors are depicted in table 49. Prevalence rate was slightly higher (2.60%) among study subjects who denied blood donation, than those who donated blood (1.65%). On analysis, results showed that there was no significant difference between these two groups ($t_{\text{(calculated)}}=.63 < t_{0.10}, \alpha=1.282$)

Table : 46 Prevalence rate (%) of HIV amongst high risk groups by practicing oral sex

Ever had Oral Sex	No. Studied							Positive for HIV							Prevalence Rate (%)
	CSWs	Truck D	Police P	PAC P	Jail inmates	Total	%	CSWs	Truck D	Police P	PAC P	Jail inmates	Total	%	
Yes	33	58	09	09	15	124	9.44	02	02	00	00	00	04	12.12	3.23
No	205	444	193	157	190	1189	90.56	08	19	00	00	02	29	87.88	2.44
TOTAL	238	502	202	166	205	1313	100.00	10	21	00	00	02	33	100.00	2.51

Statistical Significance : $t_{0.10; \alpha} = 1.282$ (Table Value), $t = .5374$ (Calculated value) $t < t_{0.10; \alpha}$ (insignificant)

Table : 47 Prevalence rate (%) of HIV amongst high risk groups practicing anal sex

Ever had Oral Sex	No. Studied							Positive for HIV							Prevalence Rate (%)
	CSWs	Truck D	Police P	PAC P	Jail inmates	Total	%	CSWs	Truck D	Police P	PAC P _i	Jail inmates	Total	%	
Yes	71	73	14	12	42	212	16.15	03	05	00	00	01	09	27.27	4.25
No	167	429	188	154	163	1101	83.85	07	16	00	00	01	24	72.73	2.18
TOTAL	238	502	202	166	205	1313	100.00	10	21	00	00	02	33	100.00	2.51

Statistical Significance : $t_{0.10; \alpha} = 1.282$ (Table Value), $t = 1.231$ (Calculated value) $t > t_{0.10; \alpha}$ (Significant)

Table : 48 Prevalence rate (%) of HIV amongst high risk groups by blood transfusion

Had undergone Blood Transfusion	No. Studied							Positive for HIV							Prevalence Rate (%)
	CSWs	Truck D	Police P	PAC P	Jail inmates	Total	%	CSWs	Truck D	Police P	PAC P	Jail inmates	Total	%	
Yes	09	11	09	06	10	45	3.43	00	03	00	00	00	03	9.09	6.67
No	229	491	193	160	195	1268	96.57	10	18	00	00	02	30	90.91	2.37
TOTAL	238	502	202	166	205	1313	100.00	10	21	00	00	02	33	100.00	2.51

Statistical Significance : $t_{0.10; \alpha} = 1.282$ (Table Value), $t = 1.816$ (Calculated value) $t > t_{0.10; \alpha}$ (Significant)

Table : 49 Prevalence rate (%) of HIV amongst high risk groups by donation of blood

Donated Blood	No. Studied								Positive for HIV						Prevalence Rate (%)
	CSWs	Truck D	Police P	PAC P	Jail inmates	Total	%	CSWs	Truck D	Police P	PAC P	Jail inmates	Total	%	
Yes	22	38	23	18	20	121	9.22	00	02	00	00	00	02	6.06	1.65
No	216	464	179	148	185	1192	90.78	10	19	00	00	02	31	93.94	2.60
TOTAL	238	502	202	166	205	1313	100.00	10	21	00	00	02	33	100.00	2.51

Statistical Significance : $t_{0.10; \alpha} = 1.282$ (Table Value), $t = .63$ (Calculated value) $t < t_{0.10; \alpha}$ (insignificant)

[B] 4 LOW RISK GROUP STUDY POPULATION

[B] 4.1 SOCIO-DEMOGRAPHIC PROFILE OF LOW RISK STUDY POPULATION

Data were gathered for the following variables

[B] 4.1.1 Age and sex : Distribution of respondents by age and sex in different low risk groups are shown in Table 50. Highest number of respondents were in 15-24 years age group. (42.74%), followed by 35-44 years age group (29.84%). Most of the participants were males.

[B] 4.1.2 Marital status : Most of the respondents were married (62.33%) and about one-third (36.67%) respondents were unmarried (Table 51). Percentage of unmarried respondents in Teachers is least (4%). There were no married respondents among students.

[B] 4.1.3 Literacy Status : About 55.33% respondents had education upto intermediate, followed by those who were educated upto graduate and above (34.67%). There were no illiterate and just literate respondent. About 3.33% respondents had education upto highschool which belonged to paramedical staff. In teachers all the respondents were graduate and above. In students all the respondents were educated upto intermediate (table 52).

[B] 4.1.4 Religion and caste : An overwhelming (Table 53) majority i.e. 85.67% were Hindu and only 8.33% of respondents were Christian/Sikh followed by Muslims (6.00%). Maximum number of Christians were from paramedical staff (23%). About 62.34% study subjects were General than followed by SC/ST (21.33%) and OBC (16.33%). Maximum number of teachers were general (88%). Least number of respondents were OBC (49%).

Table 50 - Study subject by age & sex

Age Group (year)	Students (graduates & Post graduates)		Teachers		Paramedical Staff		Total			
							Male		Female	
	Male	Female	Male	Female	Male	Female	Total	%	Total	%
15 - 24	58	42	00	00	04	11	62	35.23	53	42.74
25 - 34	00	00	04	02	03	15	07	3.98	17	13.71
35 - 44	00	00	16	08	13	29	29	16.48	37	29.84
45 - 54	00	00	54	02	09	11	63	35.79	13	10.48
≥ 55	00	00	14	00	01	04	15	8.52	04	3.23
Total	58	42	88	12	30	70	176	100.00	124	100.00

Table 51 - Study subject by marital status

Marital status	Students		Teachers		Paramedical Staff		Total	
	No.	%	No.	(%)	No.	(%)	No.	(%)
Unmarried	100	100.00	04	04.00	06	06.00	110	36.67
Married	00	00	96	96.00	91	91.00	187	62.33
Divorcee	00	00	00	00.00	01	01.00	01	00.33
Widow/ Widower	00	00	00	00.00	02	02.00	02	00.67
Total	100	100.00	100	100.00	100	100.00	300	100.00

Table 52 - Study subject by Literacy status

Marital Status	Students		Teachers		Paramedical Staff		Total	
	No.	%	No.	(%)	No.	(%)	No.	(%)
illiterate	00	00	00	00	00	00	00	00
just-literate	00	00	00	00	00	00	00	00
Junior High-School	00	00	00	00	10	10.00	10	3.33
High School	00	00	00	00	20	20.00	20	6.67
Intermediate	100	100	00	00	66	66.00	166	55.33
Graduate & above	00	00	100	100	04	04.00	104	34.67
Total	100	100	100	100	100	100.00	300	100.00

Table 53 - Subjects by religion and caste

Religion	Students		Teachers		Paramedical Staff		Total	
	No.	%	No.	(%)	No.	(%)	No.	(%)
Hindu	94	94.00	92	92.00	71	71.00	257	85.67
Muslim	04	4.00	08	08.00	06	06.00	18	6.00
Sikh/ Christian	02	02.00	00	00.00	23	23.00	25	8.33
Total	100	100.00	100	100.00	100	100.00	300	100.00
CASTE								
OBC	28	28.00	06	06.00	15	15.00	49	16.33
General	52	52.00	88	88.00	47	47.00	187	62.34
SC/ST	20	20.00	06	06.00	38	38.00	64	21.33
Total	100	100.00	100	100.00	100	100.00	300	100.00

[B] 4.1.5 Socio-economic status : Table 54, reflects upon social class of respondents which was not applicable to students. All the teachers belonged to class I (100%) social class. Maximum number of paramedical staff belonged to class III followed by class IV (26%) and class V (04%).

[B] 4.2 KNOWLEDGE ABOUT AIDS

This part of the study was designed to find out what the respondents knew and thought about AIDS. It was aimed to cover several aspects of AIDS, such as their knowledge on its curability, preventability, routes of transmission and its relations to some social factors.

[B] 4.2.1 Source of knowledge about HIV/AIDS : It is evident from table 55 that, television (42.00%) was the main source of knowledge about HIV/AIDS followed by books and magazines (38%) and newspapers (11.33%). Least percentage of study subjects (8.67%) reported that family members/friends were main source of such knowledge for them.

[B] 4.2.2 Knowledge about general aspects of HIV/AIDS

[B] 4.2.2.1 Occurrence of HIV/AIDS in India : Majority of the respondents (93.00%) were aware that HIV/AIDS occur in India (Table 56). Among teachers and paramedical staff, level of knowledge was hundred percent than students (79%).

[B] 4.2.2.2 Availability of vaccine for HIV : Only 14.33% respondents said that there is vaccine available for prevention of HIV/AIDS, while majority of respondents were aware for non-availability of vaccine.

[B] 4.2.2.3 Curability of AIDS : Table 56 shows that, about 4.3% students were wrongly aware that AIDS is curable, while percentage of respondents among teachers and paramedical staff who reported that AIDS was curable, was nil.

Table 54 - Study subjects by social class

Social Class	Students		Teachers		Paramedical Staff		Total	
	No.	%	No.	(%)	No.	(%)	No.	(%)
I	-	-	100	100.00	00	00.00	100.00	33.33
II	-	-	00	00.00	00	00.00	00	00.00
III	-	-	00	00.00	70	70.00	70.00	23.34
IV	-	-	00	00.00	04	04.00	04.00	01.33
V	-	-	00	00.00	04	26.00	26.00	08.67
Not Applicable	100	100	-	-	-	-	100	33.33
Total	100	100	100	100.00	100	100.00	300	100.00

**Table 55 - Responses on source of
knowledge of HIV/AIDS**

Source of Knowl- edge	Students		Teachers		Paramedical Staff		Total	
	No.	%	No.	(%)	No.	(%)	No.	(%)
Newspaper	07	7.00	16	16.00	11	11.00	34	11.33
Books/ Magazines	30	30.00	33	33.00	51	51.00	114	38.00
Television	51	51.00	43	43.00	32	32.00	126	42.00
Family members/ friends	12	12.00	08	08.00	06	06.00	26	8.67
Total	100	100.00	100	100.00	100	100.00	300	100.00

**Table 56 - Knowledge on general aspects of
HIV/AIDS among respondents**

State- ments	Students		Teachers		Paramedical Staff		Total	
	No.	%	No.	(%)	No.	(%)	No.	(%)
Does AIDS occeur in India?	79	79.00	100	100.00	100	100.00	279	93.00
Is their any vaccine availabel for Prevention of AIDS?	43	43.00	00.00	00.00	00.00	00.00	43	14.33
Is AIDS curable?	13	13.00	00	00.00	00	00.00	13	04.03
Is AIDS preventable?	79	79.00	100	100.00	100	100.00	279	93.00
Can condom be used for prevention of AIDS?	67	67.00	100	100.00	100	100.00	267	89.00

[B] 4.2.2.4 Preventability of AIDS : According to table No. 56, ninety three percent study subjects were aware of the fact that AIDS is preventable. Awareness was 100 percent among teachers and paramedical staff. Percentage of respondents among students who correctly stated that AIDS is preventable was 79%.

[B] 4.2.2.5 Preventability of AIDS by use of condom.

About 89% respondents reported correctly that they could prevent transmission of HIV/AIDS by using condom (table 56). Hundred percent teachers and paramedical staff knew this fact.

[B] 4.2.3 Routes of transmission of AIDS : As evident from the table No. 57, eighty three percent knew sexual route of AIDS transmission, while 81% participants knew that routes of transmission were blood and infected needle in both the cases. Vertical transmission was known to only 68.33% of respondents. Misconceptions regarding AIDS transmission viz. casual contact, sharing utensils, sneezing/coughing and mosquito- bites were present in 9.33%, 4.67%, 1% and 3% among respondents respectively. Hundred percent teachers and paramedical staff knew about the sexual route for transmission of HIV/AIDS. Misconception regarding modes of transmission was higher in students, while it was absolutely nil in case of teachers and paramedical staff.

[B] 4.2.4 AIDS - A public health problem : Table 58 shows that, approximately ninety two percent respondents knew correctly that AIDS is a major public health problem now a days. Correct answers for this were given by 77% students, and 100% teachers and paramedical staff. Only 2.33% respondents answered against this. About 5.34% respondents answered that they did not know, whether HIV/AIDS is a public health problem or not.

Table 57 - Knowledge on routes of transmission

Routes of transmission	Students		Teachers		Paramedical Staff		Total	
	No.	%	No.	(%)	No.	(%)	No.	(%)
Casual Contact	28	28.00	00	00.00	00	00.00	28	09.33
Sharing utensils	07	07.00	00	00.00	00	00.00	14	04.67
Sneezing and coughing	03	03.00	00	00.00	00	00.00	03	01.00
mosquito bite	03	03.00	02	02.00	04	04.00	09	03.00
multiple sexual partners	49	49.00	100	100.00	100	100.00	249	83.00
Infected needle	43	43.00	100	100.00	100	100.00	243	81.00
blood transfusion	43	43.00	100	100.00	100	100.00	243	81.00
mother's to new borne	22	22.00	89	89.00	94	94.00	205	68.33

**Table 58 - Responses to the question :
Whether HIV/AIDS is a public health problem?**

Responses	Students		Teachers		Paramedical Staff		Total	
	No.	%	No.	(%)	No.	(%)	No.	(%)
yes	77	77.00	100	100.00	100	100.00	277	92.33
No	07	07.00	00	00.00	00	00.00	07	02.33
Don't know	16	06.00	00	00.00	00	00.00	16	05.34
Total	100	100.00	100	100.00	100	100.00	300	100.00

[B] 4.3 Attitude towards AIDS

[B] 4.3.1 Marriages in future and AIDS testing :

According to table 59, 79.33% respondents felt that in future marriages, testing of HIV should be an important factor, where as participants who stated against this (16.67%) were more than those who were undecided (4%). Maximum respondents who felt, testing to be necessary were paramedical staff (98%) followed by teachers (71%) and students (49%). Thirty nine percent students followed by 9% teachers and 2% paramedical staff opined that there should not be any place of HIV testing before marriage.

[B] 4.3.2 Patients admission in the hospital and testing of HIV/AIDS :

Table 60 shows that 80.00% respondents were in favour of such testing, while 5% were against this and 15% were undecided. Percentage of respondents who were in favour of such testing, was 100% among teachers and paramedical staff as compared to students (40%).

[B] 4.3.3 Foreign tourists and testing of HIV : Majority of respondents (83.33%) were in favour of HIV testing of every foreign tourist (table 61). Hundred percent teachers were in favour of this fact, followed by paramedical staff (95%) students (55%). Twelve percent students and five percent paramedical staff were against the idea of such testing.

[B] 4.3.4 Opinion about sex education in school children : As shown in table 62, 68.33% respondents were favour of adding information on sexual behaviour in teaching curricula of schools. Maximum percentage of respondents who were in favour of such education were in students (76%) and paramedical staff (71%), followed by 58% teachers. Maximum participants, against this idea were from teachers (42%) and paramedical staff (26%) followed by students (12%). About five percent respondents were undecided on this matter.

**Table 59 - Responses to the question :
Should investigation of HIV/AIDS
be necessary before marriage?**

Responses	Students		Teachers		Paramedical Staff		Total	
	No.	%	No.	(%)	No.	(%)	No.	(%)
yes	49	49.00	91	91.00	98	98.00	238	79.33
No	39	39.00	09	09	02.00	02.00	50	16.67
Don't know	12	12.00	00	00.00	00	00.00	12	4.00
Total	100	100.00	100	100.00	100	100.00	300	100.00

**Table 60 - Responses to the question :
Should every patient admitted in hospital
be investigated for HIV?**

Responses	Students		Teachers		Paramedical Staff		Total	
	No.	%	No.	(%)	No.	(%)	No.	(%)
yes	40	40.00	100	100.00	100	100.00	240	80.00
No	15	15.00	00	00.00	00	00.00	15	05.00
Don't know	45	45.00	00	00.00	00	00.00	45	15.00
Total	100	100.00	100	100.00	100	100.00	300	100.00

**Table 61 - Responses to the question :
Should every foreign tourist be
investigated for HIV?**

Responses	Students		Teachers		Paramedical Staff		Total	
	No.	%	No.	(%)	No.	(%)	No.	(%)
yes	55	55.00	100	100.00	95	95.00	250	83.33
No	12	12.00	00	00.00	05	05.00	17	05.67
Don't know	33	33.00	00	00.00	00	00.00	33	11.00
Total	100	100.00	100	100.00	100	100.00	300	100.00

**Table 62 - Responses to the question :
Should see education be a lesson
for school children?**

Responses	Students		Teachers		Paramedical Staff		Total	
	No.	%	No.	(%)	No.	(%)	No.	(%)
yes	76	76.00	58	58.00	71	71.00	205	68.33
No	12	12.00	42	42.00	26	26.00	80	26.67
Don't know	12	12.00	00	00.00	03	03.00	15	05.00
Total	100	100.00	100	100.00	100	100.00	300	100.00

[B] 4.3.5 Separation of AIDS patient from family : Percentage of respondents who were in favour of separation was less (12%) than those who were against separation (81.33%). About 6.67% respondents were undecided on this matter (table 63). Nearly half (48%) of students, 96% teachers and 100% paramedical staff opined that AIDS patients should not be separated from family, while 32% students and 4% teachers were in favour of separation of AIDS patients.

[B] 4.3.6 Opinion regarding touching and care of AIDS patients : About Eighty percent respondents were of opinion that they should touch and care of AIDS patients, respondents against this view were nearly equal in percentage (10.33%) and (6.67%) respondents were undecided. Correct opinion was highest among paramedical staff (99%) followed by teachers (98%) and students (52%). Highest percentage against this view were among students (28%) followed by teachers (2%) while only one paramedical staff was against this view (table 64).

[B] 4.3.7 Avoid sex with attractive stranger : According to table 65, 89.33% respondents were of the view that they should avoid sex with attractive stranger while 1.33% respondents were against this view and 9.34% were undecided. Hundred percent teachers and paramedical staff were in favour of this statement. Only 68% students stated that they should avoid sex with attractive stranger. Only 4% students opined that they would not avoid sex with attractive strangers as shown above.

[B] 4.3.8 Working of AIDS patient in factory or office : Table 66 shows that, 76% respondents were of the view that AIDS patient can work in factory or office, while 5.33% participants were against it and 18.67% respondents were undecided. Correct opinion was given by 100% teachers and paramedical staff, followed by students (28%) who opined correctly. Percentage of respondents against this opinion was found only in students (16%).

**Table 63 - Responses to the question :
Should AIDS patient be separated
from family?**

Responses	Students		Teachers		Paramedical Staff		Total	
	No.	%	No.	(%)	No.	(%)	No.	(%)
yes	32	32.00	04	04.00	00	00.00	36	12.00
No	48	48.00	96	96.00	100	100.00	244	81.33
Don't know	20	20.00	00	00.00	00	00.00	20	06.67
Total	100	100.00	100	100.00	100	100.00	300	100.00

**Table 64 - Responses to the question :
Should a person touch and care an AIDS patient?**

Responses	Students		Teachers		Paramedical Staff		Total	
	No.	%	No.	(%)	No.	(%)	No.	(%)
yes	52	52.00	98	98.00	99	99.00	249	83.00
No	28	28.00	02	02.00	01	01.00	31	10.33
Don't know	20	20.00	00	00.00	00	00.00	20	6.67
Total	100	100.00	100	100.00	100	100.00	300	100.00

**Table 65 - Responses to the question :
Should a person avoid sex with
the attractive stranger?**

Responses	Students		Teachers		Paramedical Staff		Total	
	No.	%	No.	(%)	No.	(%)	No.	(%)
yes	68	68.00	100	100.00	100	100.00	268	89.33
No	04	04.00	00	00.00	00	00.00	04	01.33
Don't know	28	28.00	00	00.00	00	00.00	28	09.34
Total	100	100.00	100	100.00	100	100.00	300	100.00

**Table 66 - Responses to the question :
Can AIDS patient work in factory/office?**

Responses	Students		Teachers		Paramedical Staff		Total	
	No.	%	No.	(%)	No.	(%)	No.	(%)
yes	28	28.00	100	100.00	100	100.00	228	76.00
No	16	16.00	00	00.00	00	00.00	16	05.33
Don't know	56	56.00	00	00.00	00	00.00	56	18.67
Total	100	100.00	100	100.00	100	100.00	300	100.00

[B] 4.3.9 Divorce of spouse who has AIDS : According to Table 67, 9.67% study subjects were in favour of divorcing his/her spouse suffering from AIDS, whereas 74.00% respondents were against it and 16.33% were undecided. Percentage of respondents who were in favour of such an idea were nearly equal in teachers (12.00%), and students (16%), least percentage was in paramedical staff (1%). Maximum respondents were from paramedical staff (94%), who were against the idea of divorcing spouse who was suffering from AIDS followed by teachers (88%).

[B] 4.3.10 Opinion regarding feeling of ashame after having AIDS : Table 68, revealed that 10.33% respondents reported that if any person got infection of HIV, he/she should feel ashame, while about three fourth (78.33%) respondents were against such opinion and 11.34% were indifferent on this matter. Respondents who were against this view were maximum in teachers (100%) followed by paramedical staff (91%), and minimum in students (44%). Respondents who were in favour of this statement were maximum in students (28%) followed by Paramedical Staff (3%).

[B] 4.3.11 Marriage and child bearing of women with AIDS : Table 69 shows that about seventeen percent of respondents mentioned that they will suggest a women with AIDS for marriage and child bearing while most of the teachers (95%) and paramedical staff (88%) were against this view. Overall percentage of respondents who were against this view was 75.67% and 7.33% participant were undecided. This table also shows that only 10% paramedical staff and 5% teachers favoured of marriages and child bearing of woman having AIDS but percentage was higher among students (36%).

**Table 67 - Responses to the question :
Should a person divorce his/her
spouse who has AIDS?**

Responses	Students		Teachers		Paramedical Staff		Total	
	No.	%	No.	(%)	No.	(%)	No.	(%)
yes	16	16.00	12	12.00	01	01.00	29	09.67
No	40	40.00	88	88.00	94	94.00	222	74.00
Don't know	44	44.00	00	00.00	05	05.00	49	16.33
Total	100	100.00	100	100.00	100	100.00	300	100.00

**Table 68 - Responses to the question :
Should a person feel ashamed
if he/she has AIDS?**

Responses	Students		Teachers		Paramedical Staff		Total	
	No.	%	No.	(%)	No.	(%)	No.	(%)
yes	28	28.00	00	00.00	03	03.00	31	10.33
No	44	44.00	100	100.00	91	91.00	235	78.33
Don't know	28	28.00	00	00.00	06	06.00	34	11.34
Total	100	100.00	100	100.00	100	100.00	300	100.00

**Table 69 - Responses to the question :
Would you suggest a woman with AIDS for
marriage and child bearing ?**

Responses	Students		Teachers		Paramedical Staff		Total	
	No.	%	No.	(%)	No.	(%)	No.	(%)
yes	36	36.00	05	05.00	10	10.00	51	17.00
No	44	44.00	95	95.00	88	88.00	227	75.67
Don't know	20	20.00	00	00.00	02	02.00	22	07.33
Total	100	100.00	100	100.00	100	100.00	300	100.00

[B] 4.4 HIGH RISK PRACTICES

[B] 4.4.1 Age at first sexual intercourse : According to table No. 70, 25.67% respondents had their first sexual contact between 25-30 years of age, 23.67% had it between 20-24 years 9% had it between 15-19 years of age and 6.33% had it between 10-14 years of age while 35% never experienced it before. About 66% teachers had their first sexual contact between 25-30 years and 43% paramedical staff had their first sexual contact between 20 to 24 years whereas 2% students had it between 20-24 years and 98% students had never experienced it.

[B] 4.4.2 Sex with partner other than spouse : Table 71(a) shows that about one - fifth (8.95%) respondents reported that they have experienced sex with partners other than their spouses. Such percentage was found among paramedical staff (8.95%) and no such respondents were found among teachers & students. Among respondents who admitted having sex with partners other than spouses, 88.24% reported having had sex with only one partner other than spouse while, 11.76% had more than one partner (table 71b). The only respondents having multiple sexual partners were from paramedical staff (11.76%).

According to table 71(c), 2.73% respondents were unmarried but had sexual relation 97.27%, were unmarried and had no relation. Among unmarried but having sexual relations 2% belonged to students, 1% belonged to paramedical staff and no respondent was reported among teachers. Maximum students (98%) were unmarried and had no sexual contact followed by 5% paramedical staff and 4% teachers. Among unmarried but having relations, 100% respondents had relation with only one partner and none of them had multiple relations.

Table 70 - Study subject by age at sexual intercourse

Responses	Students		Teachers		Paramedical Staff		Total	
	No.	%	No.	(%)	No.	(%)	No.	(%)
10-14	00	00.00	00	00.00	19	19.00	19	06.33
15-19	00	00.00	04	04.00	23	23.00	27	09.00
20-24	02	02.00	26	26.00	43	43.00	71	23.67
25-30	00	00.00	66	66.00	11	11.00	77	25.67
Never	98	98.00	04	04.00	04	04.00	106	35.33
Total	100	100.00	100	100.00	100	100.00	300	100.00

Table 71 (a) - Study subjects who ever had sex with a partner other than spouse

Responses	Students		Teachers		Paramedical Staff		Total	
	No.	%	No.	(%)	No.	(%)	No.	(%)
yes	00	00	00	00	17	18.09	17.00	08.95
No	00	00	96	100.00	77	81.91	173.00	91.05
Total	00	00	96	100.00	94	100.00	190	100.00

Table 71 (b) - Study subjects who ever had sex with other partner by their number of sexual partners other than spouse

Responses	Students		Teachers		Paramedical Staff		Total	
	No.	%	No.	(%)	No.	(%)	No.	(%)
one	00	00	00	00	15	88.24	15	88.24
More than one	00	00	00	00	02	11.76	02	11.76
Total	00	00	00	00	17	100.00	17	100.00

**Table 71 (c) - Study subjects of unmarried
who had sexual relations**

Responses	Students		Teachers		Paramedical Staff		Total	
	No.	%	No.	(%)	No.	(%)	No.	(%)
unmarried but having relations	02	02.00	00	00.00	01	16.67	03	02.73
unmarried having no relations	98	98.00	04	100.00	05	83.33	107	97.27
Total	100	100.00	04	100.00	06	100.00	110	100.00

**Table 71 (d) - Study subjects who ever had sex
with other partner by their number
of sexual partners**

Respo- nses	Students		Teachers		Paramedical Staff		Total	
	No.	%	No.	(%)	No.	(%)	No.	(%)
one	02	100.00	00	00	01	100.00	03	100.00
More than one	00	00	00	00	00	00.00	00	00.00
Total	02	100.00	00	00	01	100.00	03	100.00

[B] 4.4.3 Study subjects by their types of sexual partners :

According to table 72, amongst respondents who had sex with partners other than their spouses, majority had done it with their friends (15%) and neighbours (3%) followed by relatives (2%). Percentage of respondents who had sex with commercial sex workers, call girls and beggars was nil. The respondents who reported having sex with their relatives and neighbours were paramedical staff, 2% and 3% respectively. Percentage of respondents had sex with friends was maximum among paramedical staff (15%) followed by students (2%).

[B] 4.4.4 Oral sex : Practice of oral sex was reported by 3.67% respondents, whereas, 96.33% had never tried it (Table 73). Hundred percent students and teachers had never experienced it. Percentage of respondents who experienced it was 11% among para medical staff.

[B] 4.4.5 Anal Sex : Anal sex was tried by 3% of study subjects, only 9% paramedical staff experienced it, (Table 74). Majority of respondents (97.00%) never tried it.

[B] 4.4.6 Spouse having any Other Sexual Partner : According to table 75(a), 3.33% respondents reported that they did not know that either of their spouses had any other sexual partner. Ninety four percent denied it and only 2.67% admitted that their spouse had one or more sexual partner other than them. Percentage of respondents who admitted it was only among paramedical staff (8%).

Among the respondents who admitted that their spouses had other sexual partners, only 1% stated that their spouses had multiple sexual partners and 87.50% stated about one such sexual partner only.

Table 72 - *Study subjects by type of their sexual partners other than spouse

Sexual Partners	Students		Teachers		Paramedical Staff	
	No.	%	No.	(%)	No.	(%)
CSW	00	00	00	00.00	00	00.00
Relative	00	00	00	00.00	02	02.00
Friends	02	2.00	00	00.00	15	15.00
Neighbours	00	00	00	00.00	03	03.00
Call Girls	00	00	00	00.00	00	00.00
Begger	00	00	00	00.00	00	00.00

*Analysis is based on multiple responses

Table 73 - Responses by practice of oral sex

Responses	Students		Teachers		Paramedical Staff		Total	
	No.	%	No.	(%)	No.	(%)	No.	(%)
yes	00	00	00	00	11	11.00	11	3.67
No	100	100	100	100	89	89.00	289	96.33
Total	100	100.00	100	100.00	100	100.00	300	100.00

Table 74 - Responses by experience of anal sex

Responses	Students		Teachers		Paramedical Staff		Total	
	No.	%	No.	(%)	No.	(%)	No.	(%)
yes	00	00.00	00	00.00	09	9.00	09	03.00
No	100	100.00	100	100.00	91	91.00	291	97.00
Total	00	100.00	100	100.00	100	100.00	300	100.00

Table 75 (a) - Respondents by their spouse having any other sexual partner

Responses	Students		Teachers		Paramedical Staff		Total	
	No.	%	No.	(%)	No.	(%)	No.	(%)
Yes	00	00.00	00	00.00	08	08.00	08	02.67
No	100	100.00	95	95.00	87	87.00	282	94.00
Don't know	00	00.00	05	05.00	05	05.00	10	03.33
Total	00	100.00	100	100.00	100	100.00	300	100.00

**Table 75 (b) - If yes, no of sexual partners
their spouse had**

Responses	Students		Teachers		Paramedical Staff		Total	
	No.	%	No.	(%)	No.	(%)	No.	(%)
I only	00	00.00	00	00.00	07	87.50	07	87.50
1+	00	00.00	00	00.00	01	12.50	01	12.50
Total	00	00.00	00	00.00	08	100.00	08	100.00

[B] 4.4.7 Use of condom during sex : Respondents who never used condom were (20.73%), nearly half of those who used it some times were (47.82%). While 43.00% respondents reported that they always used condom during sex. Majority of teachers (43.75%) and paramedical staff (43.16%) always used its whereas percentage of respondents among students was nil (table 76).

[B] 4.4.8 Need for injectables : Majority of respondents (80.33%) reported that they did not need injectables, while only 19.67% accepted it (Table 77). The proportion of respondents who have used injectables was higher in students (29%).

[B] 4.4.9 Use of disposable needles & syringes : Among those respondents who had used injectables (0.67%) never used disposable needles and syringes. A section however, (3.33%) was not sure whether they used disposable needles and syringes or not. About 96.00% study subjects reported that they always used it (table 78). Hundred percent teachers and paramedical staff used it followed by students (88%).

[B] 4.4.10 Blood transfusion : According to table 79(a), only (11%) respondents got blood transfused, while 89% reported no transfusion at all, percentage was nearly equal in all low risk groups. Fifteen percent paramedical staff, 11% teachers and 2% students, who needed blood transfusion, got it from their relatives. Three percent teachers and 2% paramedical staff (table 79b) received blood from voluntary or professional donor.

**Table 76 - Respondents by use of
condom during sex**

Responses	Students		Teachers		Paramedical Staff		Total	
	No.	%	No.	(%)	No.	(%)	No.	(%)
Always	00	00.00	42	43.75	41	43.16	83	43.00
Sometimes	00	00.00	32	33.33	38	40.00	70	36.27
Never	02	100.00	22	22.92	16	16.84	40	20.73
Total	02	100.00	96	100.00	95	100.00	193	100.00

**Table 77 - Responses by need
of injectables**

Responses	Students		Teachers		Paramedical Staff		Total	
	No.	%	No.	(%)	No.	(%)	No.	(%)
Yes	29	29.00	17	17.00	13	13.00	59	19.67
No	71	71.00	83	83.00	87	87.00	241	80.33
Total	100	100	100	100	100	100	300	100.00

**Table 78 - Respondents by use of
disposable needles & syringes**

	Students		Teachers		Paramedical Staff		Total	
	No.	%	No.	(%)	No.	(%)	No.	(%)
Yes	88	88.00	100	100.00	100	100.00	288	96.00
No	02	02.00	00	00.00	00	00.00	02	00.67
Not Sure	10	10.00	00	00.00	00	00.00	10	03.33
Total	100	100.00	100	100.00	100	100.00	300	100.00

**Table 79 (a) - Respondents by
transfusion of blood**

Responses	Students		Teachers		Paramedical Staff		Total	
	No.	%	No.	(%)	No.	(%)	No.	(%)
Yes	02	02.00	14	14.00	17	17.00	33	11.00
No	98	98.00	86	86.00	83	83.00	267	89.00
Total	100	100.00	100	100.00	100	100.00	300	100.00

**Table 79 (b) - Respondents
by source of blood**

Responses	Students		Teachers		Paramedical Staff		Total	
	No.	%	No.	(%)	No.	(%)	No.	(%)
Yes	02	100.00	11	78.57	15	88.24	28.00	84.85
Vol.Donor	00	00.00	03	21.43	02	11.76	05.00	15.15
Prof. Donor	00	00.00	00	00.00	00	00.00	00.00	00.00
Don't know	00	00.00	00	00.00	00	00.00	00.00	00.00
Total	02	100.00	14	100.00	17	100.00	33.00	100.00

Table 80 - Respondents by donation of blood

Responses	Students		Teachers		Paramedical Staff		Total	
	No.	%	No.	(%)	No.	(%)	No.	(%)
Yes	02	02.00	08	08.00	05	05.00	15	05.00
No	98	98.00	92	92.00	95	95.00	285	95.00
Total	100	100.00	100	100.00	100	100.00	300	100.00

NO. OF TIMES :

One	02	100.00	08	100.00	05	100.00	15	100.00
Two	00	00.00	00	00.00	00	00.00	00.00	00.00
Many	00	00.00	00	00.00	00	00.00	00.00	00.00

REASONS FOR DONATION :

Relative	02	100.00	08	100.00	05	100.00	15	100.00
To earn Money	00	00.00	00	00.00	00	00.00	00.00	00.00

**Table 81 - Respondents by use of
intoxicated injections**

Responses	Students		Teachers		Paramedical Staff		Total	
	No.	%	No.	(%)	No.	(%)	No.	(%)
Yes	00	00.00	00	00.00	00	00.00	00	00.00
No	100	100.00	100	100.00	100	100.00	300	100.00
Total	100	100.00	100	100.00	100	100.00	300	100.00

Table 82 - prevalence rate (%) of HIV amongst low risk groups studied

Low risk groups	No Studied		Positive for HIV		Prevalence rate (%)
	No.	%	No.	(%)	
Students	100	33.33	00	00	00
Teachers	100	33.33	00	00	00
Para medical staff	100	33.33	00	00	00
Total	300	100.00	00	00	00

[B] 4.4.11 Respondents by donation of blood : Table 80, shows that (5%) study subjects donated their blood. Of these 100% respondents donated their blood only once. All of them donated blood to their relatives.

[B] 4.4.12 Intravenous drug users : Hundred percent respondents reported that they have never taken any intoxicated injection, table (81).

[B] 4.5 PREVALENCE OF HIV AMONG LOW RISK GROUPS

The prevalence rates of HIV amongst low risk groups are depicted in Table 82. Overall prevalence rate of HIV, observed in the present study was NIL.

DISCUSSION

5. DISCUSSION

Acquired Immuno-Deficiency Syndrome (AIDS) is a major public health problem all over world. The present study was undertaken with the objective to assess the prevalence and knowledge, attitude and practices of HIV/AIDS in high risk groups viz. Truck drivers, CSWs, Jail-inmates, Police and P.A.C. personnel of Bundelkhand region, in Uttar Pradesh and low risk groups viz. students, teachers and paramedical staff of Bundelkhand region in Uttar Pradesh. The required data were collected on a pre-designed questionnaire by direct personal interview method. This type of study have some inherent limitations Firstly, the respondents have to choose only from the answers given with each question. Secondly, face to face interviewing can give wrong answer. Some people could respond with correct answers rather than what they actually felt.

[A] 5 HIGH RISK GROUPS

[A] 5.1 SOURCE OF KNOWLEDGE AMONGST HIGH RISK GROUPS

Regarding sources of knowledge on HIV/AIDS in our study, television (63.44%) formed the main source (table 6). Other sources were family members/ friends (15.46%), news papers (11.12%) and book / magazines (9.98%). Television was also found as main source of information for AIDS in the survey by Mehra *et al* (1995), Kunte *et al* (1999) and Lal *et al* (1999) and C.M. Singh (2002), whereas Shehgal (1992), Lal *et al* (1994) and Thergaonkar *et al*, (1991) showed newspaper as the chief source of information. This may be due to, at that time televisions were not so easily available, and awareness programmes about AIDS were also very less in number.

[A] 5.2 KNOWLEDGE ON GENERAL ASPECTS OF AIDS AMONGST HIGH RISK GROUPS

In the present study, a good proportion of respondents (68.24%) knew correctly that AIDS occur in India. Awareness was higher amongst P.A.C. (90.36%) and Police (88.61%) personnel as compared to other groups (Table 7). This difference was perhaps, due to higher educational level of police & P.A.C. personnel. In the study by **Chuttani et al (1990)**, half of men and 12% of women were aware of AIDS, **Bhasin et al (1999)** found that a large majority of boys (97.27%) and all girls were aware that AIDS occur in India. **C.M. Singh (2002)** found that awareness was higher amongst P.A.C. (90%) and police (89%).

Regarding preventability, (52.09%) respondents of the present study marked that AIDS is a preventable disease. Percentage of respondents who correctly answered was higher among police (87.31%) and P.A.C. personnel (75.90%), and lower among truck drivers (46.00%), CSWs (33.61%) followed by jail inmates (34.63%), it was due to higher literacy status of police & P.A.C. personnel (Table 3). Seventy seven percent naval personnel of the **Thergaonkar et al (1991)**, 52% students of **Chandra et al (1993)** and 16% to 20% adolescents of **Bhende (1994)**, new that AIDS is preventable. **C.M. Singh (2002)** in his study amongst high risk groups, found that awareness about preventability of AIDS was higher amongst police (86%) and P.A.C. personnel (75%)

Nearly half (43.95%) respondents in this study stated correctly that condom can be used for prevention of AIDS. Percentage of respondents in favour of this was highest among police (76.89%) and lowest in CSWs (27.31%). This difference seems again due to differences in literacy status. Whereas, respondents who favoured condom usage were 60% in a study by

Thergaonkar *et al* (1991), 77.5% in Chandra *et al* (1993), 63% in Velhal *et al* (1994), 70% in the survey of Francis *et al* (1994) and 49.81% in study by C.M. Singh (2002).

[A] 5.3 KNOWLEDGE ON MODES OF TRANSMISSION AMONGST HIGH RISK GROUPS

Sexual route of AIDS spread was known to 73.27% participants of our study, 50.19% and 48.21% participants reported sources of AIDS spread as infected needles and blood transfusion respectively. Vertical route was known to only 32.21% of respondents. Misconceptions were higher in CSWs, truck drivers, and in jail-inmates than police and P.A.C. personnel. Knowledge on sexual route as source of infection was low in CSWs 63.86% followed closely by jail inmates 64.39 (Table 8). In studies of Agarwal *et al* (1996), Chandra *et al* (1993) and Bhasin *et al* (1999), 50%, 85% and 97.61% respondents reported sexual route as a mode of transmission for AIDS respectively. Fifty one percent students were aware of vertical transmission of HIV (Velhal *et al*, 1994). Chandra *et al* (1993), in their study found that 71% respondents were aware of vertical route of transmission. Fifty percent and 51% respondents said that it can be transmitted by blood and through infected needles and syringes respectively (Velhal *et al* 1994). Jana *et al* (1991) in his study reported that only 69.11% sex workers were aware of its sexual transmission. C.M. Singh (2002) in his study reported that 76.09% high risk group respondents were aware of its sexual transmission and 50.19%, 48.21%, 32.21% were aware of its transmission *via* infected needle, blood transfusion and from mother to child respectively.

[A] 5.4 OPINION REGARDING AIDS AMONGST HIGH RISK GROUP

In the present study, 49.58% respondents knew diseases correctly that AIDS

is major public health problem. **C.M. Singh (2002)** reported 59.92% respondents knew correctly that AIDS is a major public health problem. In comparison to police (86.68%) and P.A.C. personnel (83.13%) only 30.73% jail-inmates 31.93% CSWs patients and 39.65% truck drivers knew the correct fact (Table-9). This could be explained on account of more accessibility of sources of knowledge on HIV/AIDS in police and P.A.C. personnel.

In this study, 54.91% respondents said that investigation of HIV/AIDS should be necessary before marriage. About 82.18% police and 95.18% P.A.C. personnel responded in favour of such testing, but in comparison to other groups, the percentage was quite high in these groups. It seems to be due to better knowledge of police and P.A.C. personnel regarding mode of transmission of HIV (Table 10). **C.M. Singh (2002)** in his study found 59.90% of respondents in favour of investigation of HIV/AIDS before marriage.

Out of total, 50.96% respondents accepted the idea of testing to all admitted patients in hospital, while 15.38% rejected it. Relatively more police (80.20%) and P.A.C. personnel (83.73%) accepted such testing. About 34% respondents were undecided on this account (Table 11). **C.M. Singh (2002)** in his study found 55.79% respondents in favour of the idea of testing all admitted patients in hospital for HIV/AIDS.

In this study, 53.40% respondents opined that every foreign tourist should be investigated for HIV. Percentage of respondents in favour of such testing was higher among police (93.07%) and P.A.C. personnel (93.37%) and was lowest among jail-inmates (18.72%). Nearly similar results were observed in a study by **Shehgal (1992)** in different high and low risk groups and **C.M.**

Singh (2002) in different high risk groups. About one third (38.00%) respondents were undecided on this matter. As Ebrahim et al (1986, 1996) reported that out of total identified HIV cases in Bahrain, 51% were foreign nationals. Hence it was necessary to acquire knowledge about the opinions regarding the above statement.

About fifty percent respondents in the present study, favoured addition of information on sex, in the teaching curriculum of school, while 27.72% were against this and 22.70% were undecided. Positive response in this study on this issue was lower than other studies like, **Mukkopadhyay et al (1996)** in their study observed that 94.4% were in favour of it and 3.6% respondents were against it and **C.M. Singh (2002)** in his study observed that 55% were in favour of it. This could be explained by lesser degree of knowledge on preventive aspects among those truck drivers, S.T.D. patients and jail-inmates who participated in this study (Table 13).

Nearly half (46.%) of the respondents of our study were against the separation of AIDS patient from the family, while 36.71% were in favour of such separation (Table 14). **Shegal (1992)** in his study in different high risk and low risk groups and **C.M. Singh (2002)** in his study in different HRGs, also observed similar results.

Percentage of respondents (33.82%) who were in favour of touch and care of AIDS patients was nearly equal (48.51%) to the respondents who were against it (table 15) same results were reported by **C.M. Singh (2002)** in his study. **Benjamine et al (1997)** found that 90% doctors, 71% Lab technicians, 81% paramedical staff were ready to shake hand with AIDS patient. **Gugnani et al (1991)** reported that 98% and 97% (medicos and non medicos respectively) were aware of the carrier state of the disease. This

may be due to lower knowledge of high risk groups regarding right mode of transmission. These observations are also indicative of inconsistent social attitude among high risk groups for AIDS patients, which may be due to wide range of prevalent myths and apprehensions about this malady (Table 8).

In the present study, 56.66% respondents were in favour of avoiding sex with stranger whereas, 10.97% were ready to take risk and 32.37% respondents were undecided on this matter. In comparison to others, more CSWs (15.13%) and more jail-inmates (15.61%) were ready to have sex with attractive stranger. Sehgal (1992) reported nearly similar results in his study. He observed that 57% respondents expressed that one should not have sex with stranger. Francis et al (1994), in their study found that 14% respondents had agreed to take risk of AIDS rather than miss the chance of having sex with an attractive stranger **C.M. Singh (2002)** found 56.66% respondents in favour of avoiding sex with stranger, where as 15.13% STD patients and 15.61% jail inmates were ready to take risk.

In this study, 64.58% respondents answered correctly that their should not be any restriction for AIDS patient to work in factory / office, while only 19.04% were against this idea. Forty five percent students in **Lal et al (1994a)** and 33.5% respondents in the study of **sehgal (1992)** opined that HIV infected AIDS cases should be totally isolated from society otherwise they will spread infection. In the same way **Gugnani et al (1991)** reported that almost all medicos and non medicos felt that there should be strict isolation of HIV positive individual along with a ban on prostitution on and homosexuality. This difference on the opinion in our study could be due to the ground of more awareness regarding different aspects of AIDS in present time. While **C.M. Singh (2002)** in his study reported that 63.39%

respondents felt that there should not be any restriction for AIDS patients to work in factory/office.

In total 37.24% study subjects in our study were in favour of divorce of spouse who had AIDS (table 18). Similar results were found by **Sehgal (1992)** and **C.M. Singh (2002)** in their study. Percentage of respondents who were against divorce was higher among police (60.40%) and P.A.C. personnel (65.66%) in comparison to truck drivers (28.88%), CSWs (26.05%) and jail-inmates (45.85%).

About fifty eight respondents in this study stated that they would feel ashamed if they had AIDS, while one third respondents were against this statement. Similar results were obtained by **Sehgal et al (1993)** and **C.M. Singh (2002)** in their study. Maximum respondents in favour of this statement were in truck drivers (79.08%) and CSWs (60.92%). Lower percentage was observed among (31.18%) in police personnel and PAC (13.61%) personnel.

Only half (43.72%) of respondents in this study stated that they will not suggest a women with AIDS for marriage and child birth, while 26.88% were in favour of marriage and child birth. These findings also suggest about low level of awareness on AIDS. Most of the P.A.C. personnel (86.75) were against such idea, while only 16.14% truckers were against this idea. This difference also seems to be due to lower educational level and lower level of awareness among truck drivers in comparison to P.A.C. personnel. Same result were obtained by **C.M. Singh (2002)** in his study on high risk groups.

About 9% respondents stated that they practice oral sex while 90.56% refused to indulge such practice. Most of the police personnel (95.54%) and

PAC personnel (94.58%) refused to practice oral sex, only (30.87%) CSWs and truck drivers (11.55%) reported in favour of question. Similar result were obtained by **C.M. Singh (2002)** in his study of high risk groups. While **Jana et al (1994)** reported in his study on CSWs in Calcutta that 94.44% sex workers practiced oral sex. Such difference seems to be due to unwillingness of respondents to answer this questions.

[A] 5.5 PREVALENCE RATE OF HIV AMONGST HIGH RISK GROUPS

The present study revealed an overall prevalence rate of HIV amongst high risk groups to be 2.51%. Results of different high risk groups are discussed in detail as under –

[A] 5.5.1 Seroprevalence of HIV in commercial sex workers : Prevalence rate of HIV in female CSWs in this study was 4.20%. Only 238 CSWs could be studied due to no defined area (or red light area) of CSWs in Bundelkhand region. Total 10 respondents were found seropositive for HIV. Agarwal et al (1999) in their study found 12% HIV seropositivity amongst female sex workers in Manipur. **Gulati et al (1999)** in their study found 6.8% seropositivity amongst high risk group in Varanasi.

[A] 5.5.2 Seroprevalence of HIV in truck drivers : Out of 502 truck drivers tested for HIV in this study, 21 (4.18%) were detected positive. The prevalence rate among truckers in this study is almost nearer to other studies on truckers. **Joshi & Prasad (1999)** observed a rate of 6.2%, Singh et al (1999) observed a prevalence rate of 4.3% and **Meda et al (1998)** observed a prevalence rate of 18.6% in truckers of Burkina Faso. Prevalence rate among truck drivers was lower (2.13%) in the studies by **C.M. Singh (2002)**.

[A] 5.5.3 Seroprevalence of HIV among police & P.A.C. personnel : Out of 202 police and 166 P.A.C. personnel who were subjected to ELISA test, no one turned up positive for HIV (Table 34). With our best efforts, we were unable to find any other such kind of study which can reveal seroprevalence of HIV among police and P.A.C. personnel, except one study by **C.M. Singh (2002)** which also revealed zero prevalence rate among P.A.C. and police personnel. This zero prevalence rate may be due to many reasons. It may be due to low sample size, unwillingness of respondents who were engaged in risky sexual practices to participate in this study, and a good level of awareness about different methods of prevention and transmission of HIV infection, as observed in this study.

[A] 5.5.4 Seroprevalence of HIV among jail-inmates :

Prevalence rate among jail-inmates in this study was 0.98%. Out of 205 prisoner only two were found positive for HIV (Table 34). Higher prevalence rate had been reported by some authors in their studies, while there are ample of evidences in favour of low prevalence rates among Indian prisoners. **Lal et al (1999)** in their study in Orissa jail observed that out of 300 prisoners of Indian origin, no one was positive for HIV. Similarly Arora et al (2000) also observed a very low level of positivity (0.08%) among prisoner of Haryana state, Sunder et al (1995) observed slightly higher positivity rates (1.98%) and **C.M. Singh (2002)** in his study found only 0.49% prevalence rate among jail inmates in Jhansi.

[A] 5.5.5 Prevalence rate (%) of HIV in relation to various socio-demographic variables :

5.5.5.1 Age specific prevalence rate :

The present study found that all the positive study subjects were between 18-25 yrs. (2.91%) and 26-54 years (2.46%). But the results were statistically

insignificant. Similar results were reported by **Singh *et al* (1999)**. Out of 378 participants below 26 years age, only 11 were found positive, while there were 22 positive cases, aged between 26-54 years. This study thus, shows that majority of respondents who detected positive for HIV were sexually active and of economically productive age group. Similar results were reported by NACO (2005) that 89% of reported cases are from sexually active and economically productive age group (18-40 years), and **C.M. Singh (2002)**.

5.5.5.2 Marital status specific prevalence rates :

The present study revealed a much higher prevalence of HIV among unmarried participants (3.46%) in comparison to the married (2.16%) and results were statistically in significant, same results were revealed by **C.M. Singh (2002)** in his study on HRGs. As against this, **Rathore (1997)**, **Singh *et al* (1999)** and **Sunder *et al* (1995)** found that majority of HIV sufferers were married. However, no association of HIV/AIDS with marital status was found by **Mathai *et al* (1990)** and **Mahendale *et al* (1996)**. In this study, positivity was higher in unmarried respondents. This may be due to smaller size of studied sample of unmarried participants and decrease in age of first sexual contact as shown in table 23. Our results showed that 88.65% of CSWs, 58.04% of jail-inmates, 44.43% truckers had experienced first sexual contact before or up to 19 years of age.

5.5.5.3 Literacy Status specific prevalence rates :

In the present study, out of 137 illiterate participants only one (.41%) was positive for HIV, twelve (5.41%) out of 222, were positive among just literate respondents and twenty (3.08%) out of 649 were positive among moderately literate respondents, while no one was detected positive among well literate group. It was also seen that the HIV seropositivity decreased as

the educational status increased (Table 37). Similar results were reported by Singh et al (1999), **Sunder et al (1995)** and **Mahendale et al (1996)** and C.M. Singh (2002). Such result was statistically highly significant.

5.5.5.4 Religion And caste specific prevalence rates :

In this study, positivity was slightly higher in Hindus (2.65%) in comparison to Muslims (1.94%) but results were not statistically significant ($t_{(calculated)} = .595$; $t < t_{0.10, \alpha} = 1.282$), thereby indicating that Hindus and Muslims were equally susceptible to HIV infection. C.M. Singh (2002) reported positivity slightly higher in muslims in comparison to Hindus. Positivity was higher in SC/ST groups (4.46%) and lower in General (1.57%) and Backwards classes (2.11%). This is understandable since in India, caste is strong social and economic factor. Literacy status is also very low in these groups. Same is the case about awareness of health. On analysis, we found that results in the other two groups General and others, were not different significantly. Results were not statistically significant ($t_{(calculated)} = .607$; $t < t_{0.10, \alpha} = 1.282$).

5.5.5.5 Socio economic status specific prevalence rates : In this study, all participants were either from middle or lower classes and, there was no any participant from upper class (Table 40). This was due to their nature of job and low income. It was observed that all the positive participants were from lower class. As we understood, social and economic situation that create vulnerability to HIV infection has not been adequately studied or explained. There is little information available about different socio-economic groups in India in terms of their basic sexual and drug-taking behaviours. **Mathai et al (1990)** in their study observed that most of HIV infected patients (57%), belonged poor socio-economic background. Through such result was statistically highly in significant. ($t_{(Calculated)} = .048$; $t < t_{0.10, \alpha} = 1.282$). C.M. Singh (2002) also reported the same results.

5.5.5.6 Prevalence rate (%) of HIV amongst high risk groups by use of condom :

In present study, it was observed that prevalence of HIV was higher (3.63%) in respondents who never used condom in comparison to those who used it for some times (1.27%), while it was zero among those who used it always. These results were significantly different. Out of total positive respondents, 78.79% stated that they never used condom while 21.21% used it some times. These finding shows that there is definite role of condom in prevention of HIV transmission. This could also be explained as maximum percentage of respondents who stated that they never used condom was in CSWs (68.91%), truck drivers (65.87%) and jail-inmates (65.71%). Results were statistically highly significant. Same results were reported by C.M. Singh (2002) and Jana *et al* (1994).

5.5.5.7 Prevalence rate (%) of HIV amongst high risk groups who had sex with partner other than their spouse :

In present study, it was observed that out of total positive cases, 82.35% reported that they had sex with partners other than their spouse and 17.65% were against of such sexual activity (Table 43). Such results were found to be statistically highly significant ($t_{(Calculated)} = 4.09$; $t_{>.005, \alpha} = 2.576$). It was also observed that 73.33% of HIV positive cases had sex with more than one partner, other than their spouse and 26.67% reported it with one partner only. These findings reflect that with increase in number of sexual partners, HIV positivity is also likely increase. Similar results were reported by C.M. Singh (2002) in his study , that about 85.71% respondents reported that they had sex with parteners other than their spouse.

5.5.5.8 Prevalence rate (%) of HIV amongst high risk groups by their numbers of sexual partners other than spouse :

In this study, it was observed that though HIV positivity was higher (5.80%), among those respondents who accepted that they had multiple sexual partners others than spouse in comparison to those who denied it (5.30%), but there was no statistical significance of the above table as $t_{(calculated)} = .227$; $t_{t_{0.10}, \alpha} = 1.282$ (table 44). Nearly 100% of CSWs, 28.38% of truck drivers and 19.48% of jail inmates (Table 22a) admitted having sex with partners other than spouse. HIV seropositivity was higher among truck drivers who admitted this fact. Similar results were observed by Singh et al (1999) in their study on truck drivers and C.M. Singh (2002) in his study on high risk groups. Out of total positive cases, 73.33% admitted having sex with multiple sexual partners and only 26.67% stated that they had sex with only one partner other than their spouse. Similar observation was made by Mahendale (1998) and C.M. Singh (2002).

5.5.5.9 Prevalence rate (%) of HIV amongst high risk groups by their type of sexual partners :

Prevalence of HIV among those 99 respondents who admitted having sex with commercial sex workers was 33.33%. Even higher prevalence (39.39%) was noted among respondents who had sex with friends, this may be due to lower numbers of respondents who admitted sex with friends.

5.5.5.10 Prevalence rate (%) of HIV amongst high risk groups practising oral sex :

In this study majority of respondents (90.56%) denied oral sex (table 46). Prevalence rate was higher (3.23%) among those participants who admitted that they had oral sex in comparison to those who denied it 2.44%, but result was statistically not significant ($t_{(calculated)} = 4$; $t_{t_{0.10}, \alpha} = 1.282$). So this study

shows that there was no increase risk of HIV infection among those who had experienced oral sex only, because most of HIV positive (87.88%) case were, who never experienced oral sex.

5.5.5.11 Prevalence rate (%) of HIV amongst high risk groups practising anal sex :

In this study percentage of respondents who admitted having anal sex was (16.05%) and percentage was higher among CSWs (29.83%), jail-inmates (20.49%) and truck drivers (14.54%). Prevalence of HIV was significantly ($t_{(calculated)} = 1.231$; $t \leq t_{0.10, \alpha} = 1.282$) higher among those study subjects who admitted having anal sex 4.25% in comparison to those who never experienced it (table 47). This shows that there is definite increase risk of HIV transmission by anal intercourse, similar result was observed by Mahendale *et al* (1996) and C.M. Singh (2002).

5.5.5.13 Prevalence rate (%) of HIV amongst high risk groups by donation of blood :

In present study it was observed that only 9.22% study subjects donated their blood (table 49). Prevalence rate of HIV was slightly higher among non blood donors (2.60%) in comparison to those who donated blood (1.65%), and result was insignificant statistically ($t_{(calculated)} = .63$; $t < t_{0.10, \alpha} = 1.282$). So by this study it can not be stated that whether there is increase risk of HIV infection among blood donors or not.

5.5.5.12 Prevalence rate (%) of HIV amongst high risk groups by transfusion of blood:

In present study it was observed that only 3.43% respondent had undergone blood transfusion (table 48). Prevalence rate of HIV was significantly higher among those who had undergone blood transfusion (6.67%) in comparison to

those who never undergone blood transfusion (2.37%). The result was statistically significant ($t_{\text{(calculated)}} = 1.816$; $t > t_{0.10, \alpha} = 1.282$). Nearly same result were reported by C.M. Singh (2002).

[A] 5.6. Status of immune system in HIV positive respondents :

In the present study total thirty three (high risk groups) cases were found to be HIV positive. The HIV infection, in these HIV positive respondents was upto the mark, according to the parameters given in WHO case definition for AIDS surveillance. Almost all the respondents except few reported about three major signs of HIV infection.

- weight loss > 10% of body weight
- Chronic diarrhoea for more than one month
- Prolonged fever for more than one month (intermittent or constant).

Some of the respondents also reported about persistent cough for more than one month and oropharyngeal candidiasis. It indicates most of the HIV positive respondents had passed the first stage of HIV infection and were in second or third stage of HIV infection with the CD_4^+ cell count $\geq 500/\text{cu. mm}$ or CD_4^+ cell count between 200-500 cu.mm.

[B] LOW RISK GROUPS

[B] 5.1 SOURCE OF KNOWLEDGE AMONGST LOW RISK GROUPS

Regarding sources of knowledge on HIV/AIDS in our study television (42.00%) formed the main source (table 55). Other sources were books/magazines (38%), newspapers (11.33%) and family members/friends (8.67%). This may be due to awareness programmes about AIDS which are being displayed and due to easy availability of televisions.

[B] 5.3 KNOWLEDGE ON MODES OF TRANSMISSION AMONGST LOW RISK GROUP -

Sexual route of AIDS spread was known to 83% participants of our study, 81% participants reported sources of AIDS spread as infected needles and blood transfusion respectively. Vertical route was known to only 68.33% of respondents. Misconceptions were slightly reported amongst students only. Knowledge on sexual route as source of infection was low in students. Eighty percent students were unaware of vertical transmission of HIV. Fifty one percent students were aware of vertical transmission of HIV (Velhal *et al*, 1994).

[B] 5.4 OPINION REGARDING AIDS AMONGST LOW RISK GROUP -

In the present study, 92.33% respondents knew correctly that AIDS is major public health problem. In comparison to teachers and paramedical staff (100%) only 77% students knew the correct fact (Table 58), this could be explained on account of more accessibility of sources of knowledge on HIV/AIDS in teachers and paramedical staff.

In this study, 79% respondents said that investigation of HIV/AIDS should be necessary before marriage. About 98% and 91% paramedical staff and teachers respectively responded in favour of such testing but in case of students only 49% responded in favour of testing. It seems to be due to better knowledge of teachers and paramedical staff regarding mode of transmission of HIV (Table 57).

Out of total, 80% respondents accepted the idea of testing to all admitted patients in hospital, while only 5% rejected it. Hundred percent teachers and

paramedical staff accepted such testing. About 15% respondents were undecided on this account (Table 60).

In this study, 83.33% respondents opined that every foreign tourist should be investigated for HIV. Percentage of respondents in favour of such testing was 100% amongst teachers, 95% amongst paramedical staff and only 55% amongst students.

Again, it seems to be due to lack of knowledge among students about AIDS transmission. Eleven percent respondents were undecided on this account and those were only students.

About 68.33% percent respondents in the present study, favoured addition of information on sex, in the teaching curriculum of school, while 26.67% were against this and 5% were undecided. Positive response in this study on this issue was slightly lower among teachers and paramedical staff than students (table 62). This may be due to willingness of students to remove their ignorance regarding AIDS.

Only twelve percent of the respondents of our study were in favour of the separation of AIDS patients from the family, while 81% were against the separation (Table 63). Shegal (1992) in his study in different high risk and low risk groups also observed similar results.

Percentage of respondents (83%) who were in favour of touch and care of AIDS patients and only 10.33% respondents were against it (table 64). **Benjamine *et al* (1997)** found that 90% doctors, 71% lab technicians, 81% paramedical staff were ready to shake hand with AIDS patient.

In the present study, 89.33% respondents were in favour of avoiding sex with strangers where as, only 1.33% were ready to take risk and 9.34% respondents were undecided on this matter. Hundred percent teachers and paramedical staff were in favour of the statement while only 4% students were against the statement, this may be due to lack of knowledge about AIDS amongst some students (Table 56).

In this study, 76% respondents answered correctly that their should not be any restriction for AIDS patient to work in factory/office, while only 5.33% were against this idea. Forty five percent students in Lal et al (1994) and 33.5% respondents in the study of Sehgal (1992) opined that HIV infected AIDS cases should be totally isolated from society otherwise they will spread infection. This difference on the opinion in our study could be due to the ground of more awareness regarding different aspects of AIDS in present time.

In total 74% study subjects in our study were in favour of divorce of spouse who had AIDS (table 67). Similar results were found by Sehgal (1992), in his study. Percentage of respondents who were against divorce was higher among paramedical staff (94%) and teachers (88%) in comparison to students (40%).

About 10.33% respondents in this study stated that they would feel ashamed if they had AIDS, while 78.33% were against this statement. Maximum respondents in favour of this statement were students (44%). Hundred percent teachers were against this statement followed by paramedical staff (91%), (table 68).

Seventy five percent of respondents in this study stated that they will not

suggest a women with AIDS for marriage and child birth, while 17% were in favour of marriage and child birth. These findings also suggest about low level of awareness on AIDS. Most of the teachers (95%) were against this idea. Only 44% students were against the idea and about 20% students refused to answer. This was also due to lack of awareness among students.

[B] 5.5 PREVALENCE RATE OF HIV AMONGST LOW RISK GROUPS

The present study revealed an overall zero prevalence rate of HIV amongst low risk groups.

CONCLUSIONS
AND
RECOMMENDATIONS

6. CONCLUSIONS & RECOMMENDATIONS

The present study, entitled "Seroprevalence of HIV/AIDS and study of immune system in high risk and low risk groups in the region of Bundelkhand in Uttar Pradesh," was carried out in department of Microbiology of M.L.B. Medical College, Jhansi. Following inferences have been drawn from this study.

6.1 CONCLUSIONS

- In high risk groups (HRGs), television (67.65%) was the main source of knowledge for HIV/AIDS. P.A.C. personnel (51.81%) were mainly dependent on newspapers. After the television, family members/friends (15.46%) and newspapers (11.12%), were main source of knowledge.

In low risk groups (LRGs), also, television (42%) was the main source of knowledge for HIV/AIDS. Paramedical staff (51%) were mainly dependent on books/magazines. After television, books and magazines (38%) and newspapers (11.33%) were the main source of knowledge.

- In high risk groups altogether, (68.24%) respondents were aware that AIDS occurs in India. Most of the participants among police (73.11%) and P.A.C. (90.36%), correctly reported its presence in India. While its presence was known to only 47.80% jail inmates and (42.85%) CSWs.

In low risk groups, over all 93% respondents were aware that AIDS occurs in India. Hundred percent teachers and paramedical were aware of occurrence of AIDS in India while, 21% students were unaware about this fact.

- In high risk groups, majority of respondents were aware that there is no vaccine available for prevention of HIV/AIDS. Only 15.61% were having incorrect information that there is vaccine for prevention of AIDS.

In low risk groups, also majority of respondents were aware that there is no vaccine available for prevention of HIV/AIDS. Only 14.33% were having incorrect information that there is vaccine for prevention of AIDS.

- In high risk groups, about one fourth (27.11%) respondents, incorrectly reported that AIDS is curable. More than half of the (52.09%) respondents were having correct information that AIDS is preventable and the knowledge was highest amongst police (87.31%) followed by P.A.C. personnel (75.90%).

In low risk groups, only 4.3% respondents, incorrectly reported that AIDS is curable, on the other side ninety three percent correctly knew about the preventability of AIDS.

- In high risk groups, about half (43.95%) of the respondents knew that condom can be used for prevention of AIDS and again knowledge was highest in police personnel (76.89%), followed by P.A.C. personnel (73.49%). Knowledge was lowest amongst CSWs (27.31%) due to lower educational status.

In low risk groups, eighty nine percent respondent knew that condom can be used for prevention of AIDS. Again hundred percent teachers

and paramedical staff correctly knew about this fact while only 67% students correctly knew about it.

- Amongst high risk groups, although, most of the respondents (73.27%) knew about, sexual transmission of HIV, infected blood, infected needles and perinatal routes were known to only 48.21%, 50.19% and 32.21% respondents respectively. Awareness about sexual routes was lower in CSWs (63.86%), jail inmates (64.39%) and in truck drivers (69.72%). Misconceptions regarding HIV transmission were higher in CSWs, jail-inmates, truck drivers.

In low risk groups, altogether 83% respondents knew about, sexual transmission of HIV and 81% respondents knew about its transmission through infected needle and blood transfusion. Awareness about perinatal routes were reported in 68.33% respondents. Awareness about all the four routes was lower in students (49%, 43%, 43% and 22% respectively). Misconception regarding HIV transmission were reported in students. Misconception regarding spread of AIDS through mosquito bite was reported in 3%, 2% and 4% students, teachers and paramedical staff.

- In high risk groups, about fifty percent respondents knew that AIDS is a major public health problem. The knowledge was, however, lower amongst jail-inmates (30.73%), CSWs (31.93%) and truck drivers (39.65%) possibly due to their lower literacy status.

In low risk groups, 93.33% respondents knew that HIV/AIDS is a major public health problem. Only 23% students responded incorrectly.

- In high risk groups, regarding role of HIV testing before marriages, most of the respondents (54.91%) were in favour of this idea. Most of the police (82.18%) and P.A.C. personnel (95.18%) supported this idea, while most of the CSWs and jail-inmates were against the testing of HIV before marriage.

In low risk groups, regarding role of HIV testing before marriages, most of the respondents (79.33%) were in favour of this idea. Only 49% students responded in favour of the statement, while only 9% and 2% teachers and paramedical staff were against the above statement.

- In high risk groups, about 50.96% responded were of view that every patient admitted to hospital should be investigated for HIV, while 15.38% were against of such testing. Most of the police (80.20%) and P.A.C. personnel (83.73%) supported this idea. Nearly one-third (33.66%) participants remained undecided on this matter.

Amongst low risk groups, 80% respondents were of view that every patient admitted to hospital should be investigated for HIV while 5% were against of such testing and 15% remained undecided on this matter. About 45% students remained undecided about the matter.

- Amongst high risk groups, the respondents who were of view that every foreign tourist must be investigated for HIV/AIDS, were more than half (53.40%). Almost equal personnel from police and P.A.C. (93.07% and 93.37% respectively) were in favour of compulsory testing for every foreign tourist.

In low risk groups, 83.33% respondents were of view that every foreign

tourist must be investigated for HIV/AIDS. But only 55% students were in favour of the statement and 33% students were undecided on this matter while 5% were against the statement.

- Amongst high risk groups, nearly half (49.58%) of the respondents were in favour of introduction of sex education for school children. About one-fourth (27.72%) participants were against this view.

In low risk groups, about 68.33% respondents were in favour of introduction of sex education for school children. Maximum percentage of students (76%) and minimum percentage of teachers (58%) were in favour of the above matter.

- In high risk groups, respondents who were in favour of separation of AIDS patients from family were less than those who were against such separation (36.71% and 46% respectively). While 17.29% respondents were undecided on this matter.

Amongst low risk groups, 81.33% respondents were against the separation of AIDS patients from the family and only 12% were in favour of separation. Among students 32% respondent were in favour of separation.

- In high risk groups, it was matter of sorrow that more respondents (48.51%) were not ready to touch and care for AIDS patients. Such percentage was higher amongst truck drivers (60.76%), jail-inmates (60%) and CSWs (58.82%). Only 48.51% participants were in favour of touching and caring for AIDS patients.

Amongst low risk groups, 83% respondents were in favour of touch and care of an AIDS patient. Only 10.33% participants responded against the above statement, which included 26% students, 2% teachers and 1% paramedical staff.

- In high risk groups, majority of respondents (56.66%) were against, to have sex with stranger and 10.97% respondents had no problem in marking such sexual relation, while 32.37% participants were undecided on this issue.

In low risk groups, 89.33% respondents were against, to have sex with stranger and merely 1.33% respondents had no problem in making such sexual relation, while 9.34% participants were undecided on this issue.

- Amongst high risk groups, about two-third (64.58%) respondents reported that AIDS patient can work in factory/office, however, 19.04% participants were against of this idea.

In low risk groups, 76% respondents reported that AIDS patient can work in factory/office, and only 5.33% respondents were against this. Altogether, 18.67% respondents were undecided about the fact. Hundred percent teachers and paramedical staff were in favour of the statement.

- In high risk groups, on matter of divorce of spouse who had AIDS, majority (40.52%) were in favour of keeping their spouse along with them and only 37.24% respondents were in favour of divorce. Such percentage was higher among truck drivers (43.43%), jail-inmates (43.42%) and CSWs (42.86%).

Amongst low risk groups, 74% respondents reported against the matter of divorce of spouse who had AIDS and only 9.67% respondents were in favour of divorce and 16.33% were undecided about the matter. Such percentage was higher among students (44%).

- In high risk groups, the greater proportion (58.42%) of respondents of these five groups would feel ashamed if they had AIDS, while 26.96% respondents answered that person should not feel ashamed if he/she had AIDS.

In low risk groups, about 17% respondents would feel ashamed if they had AIDS, while 75.67 respondents answered that person should not feel ashamed if he/she had AIDS.

- In high risk group, about half (43.72%) of participants answered that a women should not be married if she is suffering from AIDS. If she is already married then she should not conceive, while 29.40% respondents were not in position to answer on this matter and 26.88% participants were in favour of marriage and child bearing.

In low risk groups, about three fourth (75.67%) of the participants answered that a women should not be married if she is suffering from AIDS. If she is already married then she should not conceive, while 17% respondents were in favour of the above matter and 7.33% respondents were undecided regarding it.

- In high risk groups, in total, 9.44% respondents had experienced oral sex. Practice of oral sex was found more in C.S.Ws (13.87%), followed

by truckers (11.55%). It was lowest amongst police personnel (4.46%).

Amongst low risk groups over all 3.67% only experienced oral sex. Such percentage was reported only in paramedical staff (11.00%).

- In high risk groups, practice of anal sex was low, as only 16.15% respondents had experienced it. Respondents who practiced oral sex were comparatively more amongst C.S.Ws (29.83%) than jail-inmates (20.49%). It was again lowest amongst police personnel (6.93%).

In low risk groups, again only 3% respondents had experienced it, which was exclusively amongst paramedical staff.

- In high risk groups, nearly half of respondents (45.95%) accepted use of condom either sometimes or always. Condom usage was lower in C.S.Ws, truckers and jail-inmates.

Among low risk groups, only 79.27% respondents accepted use of condom sometimes or always. While 20.73% responded never used it.

- In high risk groups, only 3.43% respondents needed blood transfusion and majority of them (60%) received blood from their relatives. Only 4.44% of respondents, who got blood transfusion, received it from professional donors.

In low risk groups, only 11% respondents had undergone blood transfusion and majority of them (84.85%) received blood from their relative and rest 15.15% had received it from voluntary donors.

- In high risk groups, only 9.22% respondents donated blood either once or more and majority of them nearly 87% donated blood to their relative. Remaining (13.22%) gave it to earn money.

In low risk groups, overall only 5% respondents donated blood once in their life and all of them had given it to their relatives.

- In high risk group, prevalence rate of HIV was highest among C.S.Ws (4.20%), truckers (4.18%), followed by jail-inmates (0.98%). There was none of HIV/AIDS amongst police and P.A.C. personnel.

In low risk group, no seropositivity for HIV/AIDS was reported.

- In high risk groups, prevalence rate was highest (2.91%) amongst youngsters (18-25 years). Most of the study subjects (3.46%) who were tested positive for HIV, were unmarried in comparison to married group (2.16%).
- In high risk groups, positivity was highest amongst just literates (5.41%), followed by participants who were moderately literate (3.08%).
- In high risk groups, prevalence of HIV amongst respondents who had sex with partners other than their spouse was relatively very high (4.23%) as compared to respondents who had no such partners.
- In high risk groups, prevalence of HIV was much higher amongst participants who had sexual intercourse with friends (39.39%) and commercial sex workers (33.33%) than those who had sex with others.

- Amongst those study subjects of high risk groups, which admitted that they had experienced anal sex, HIV positivity was higher (4.25%) while such percentage was relatively lower (2.18%), amongst those who denied for such type of sexual activity.
- In high risk groups, Among the thirty three HIV positive respondents, almost all of them reported about the problem of fever (recurrent or continuous) and diarrhoea from last one month. Few of them also reported the problem of oropharyngeal candidiasis and cough. These symptoms generally develop in first and second stage of HIV infection with their CD_4^+ count ≥ 500 /cub. mm., and CD_4^+ count ranging between 200-500 cub. mm., respectively.

6.2 RECOMMENDATIONS

In the present study, results have been described and discussed in detail and conclusions drawn. On the basis of these results and conclusions, several measures can be suggested to control the rapid spread of AIDS menace. Some of the recommendations are as follows.

- As the main source of information for AIDS was television and news paper, there is urgent need to develop good television programmes and literature on AIDS, so as to make people aware about correct facts.
- The reproductive health education should be part of curriculum in all schools. There should be classroom based educational programmes on STD/AIDS beginning from secondary classes and onwards and class teachers should be properly trained for educating the students effectively.
- The only socio-demographic variable which have a good effect on AIDS awareness and can be further improved, is literacy status.

Hence, Programmes should be devised and implemented to enhance the literacy status of the population.

- There should be posters and roadside bill boards and painting on walls carrying HIV/AIDS message, video shows at the congregation of people like exhibitions and fairs, should be organised to provide the knowledge and to create awareness about HIV/AIDS.
- Public awareness programmes should be directed towards all sections of society irrespective of income, education, occupation, creed and caste.
- Apart from government sectors, AIDS education should activate and co-ordinate the local health agencies, NGOs', media agencies and involve educational institutions, industries, offices, as well as community at large for an effective educational programme.
- National AIDS Control Programme should be strengthened further to prevent the transmission of AIDS through blood or unsterilized needles and to make the people aware about AIDS through I.E.C. (information, education, communication) campaigns.
- For developing countries, there are social and economical constraints with limited resources. Hence, community surveillance for HIV/AIDS is the best measure for planning the prevention and control strategy.
- Finally, as the results present study differ from other similar studies on some important aspects, such as low prevalence rate in jail inmates, zero prevalence rate amongst police and P.A.C. personnel's, and low risk groups etc, it is suggested to conduct another indepth study in the same or similar area to confirm the findings of this study.

REFERENCES

REFERENCES

1. Agarwal A.K. and Kumar R., (1996) : Awareness of AIDS among school children in Haryana. Indian J. of Public Health 40: 38-45.
2. Agarwal A.K., Singh G.B., Khundom K.C., Singh N. Devendra, Singh T., and Java S. : The prevalence of HIV in female sex workers in Manipur, India. Journal of communicable diseases : March 1999; 31 : 23-26.
3. Agarwal Kamal, Kannan A.T., Grover V., Kumar Parveen, Puri A.K.: Knowledge and Attitude towards AIDS amongst college youth of East Delhi; HIV/AIDS Research in India 1993; 213-215.
4. Agarwal V.K., Chandra S.S., Ganguli S.K., Gupta S.K., Das S. and Vidya R., (1993) : Awareness about AIDS - A study among colleges students. Indian Journals of Preventive and Social Medicine; 24: 84-88.
5. Ahmed Aftab, (1996) : Level of awareness among commercial sex workers on AIDS and STD -An empirical study. HIV/AIDS Research in India; 278-279.
6. Alexander Glory (2002) : Women and HIV / AIDS : CMJ1 2002 ; 17 : 22 - 24.
7. Al-Haddad M.K., Baig B.Z.H., Ebrahim R.A.: Epidemiology of HIV and AIDS in Bahrain. Journal of Communicable diseases : Dec 1997 ; 29 : 321-323.
8. Arora D.R., Gupta V., and Arora B., (2000) : Surveillance of HIV infection in Haryana. Indian J. Comm. Med.; 25, 19-25.
9. Arora P.N. and Prasad R.S., (1992); HIV serosurveillance in an STD Center in Armed Force. MJAFI; 48: 189-190.
10. Ashebir D.Z., (1996) : An assessment of AIDS awareness programme - for I.C.D.S. functionaries. Indian J. Public Health: 1996 Jul-Sept; 39: 100-104.

11. Asindii A.A., Ibia E.O., Young M.U., (1992): Acquired immuno deficiency syndrome : Education Exposure Knowledge and attitude of Nigerian adolescents in Calabar. *Ann. Trop paediatr*: 1992, 12 : 397 - 420.
12. Balaganesh G., Ramakrishnan, Rao Shreehari Y. and Babu Sudhakar V., (1993): A study on the awareness about AIDS/STDs in Indian communities *Indian J. Sex. Transm. Dis.* 14; 33-34.
13. Balaganesh G., Chandrasekhar V., Sai T.S.R. and Babu V.S., (1994) : Survey on public awareness on AIDS in a rural South-Indian community. *Indian J Comm. Med.*; 19: 31-35.
14. Bansal R.K., Srivastava R.K., Saxena D.M.: (1994): An exploratory KABP study on AIDS in Indigenous Medical Practitioners and RMP's in Central India. *Indian J. Dermatol Venerol Leprol.*: 1994; 60.
15. Benjamin A.I. and Zachairah P., (1997) : KABP study on prevention of AIDS among health professional. *HIV/AIDS Research in India*; 294-298.
16. Bhasin S.K., Pandit K., Kannan A.T. and Dubey K.K., (1999) : Impact of information education and communication intervention on knowledge regarding AIDS amongst senior secondary school children of East Delhi. *Indian J. Comm. Med.*; 24: 167-171.
17. Bhattacharya M., (1994): AIDS Awareness among Anganwari Workers and Labourers. *CARC Calling Vo.*, 7, No.2, Apr-Jun 1994 : 32.
18. Bhende A.A., (1994) : A study of sexuality of adolescent girls and boys in under - privileged groups in Bombay. *The Indian Journal of Social work*, LV 557-571.
19. Bhupesh M., (1992) 'India Disquiet About AIDS Control. *The Lancet*, Vol240, No. 8834/8835
20. Bollinger R., Tripathy S. and Quinn T., (1995): The human immunodeficiency virus epidemic in India. *Medicine*. 74: 97-106.

21. Brooks Gunn and Paikoof, (1992) : School based education for AIDS. HIV/AIDS Research in India: 128.
22. 'Can India avoid being devastated by HIV?', (2002). BMJ: January 36
23. Carmen A., and Moody H., (1985) working women : The Subterranean world of street prostitution. New York : Harper and Row.
24. Centres for Disease Control (CDC), (1987): Antibody to human immunodeficiency virus in female prostitutes. Morbidity and Mortality Weekly Report 36 ; 157 - 161.
25. Chandra Mani Singh (2002) : A cross sectional study on HIV/AIDS Prevalence in solve high risk groups of District Jhansi in Uttar Pradesh, 49-103.
26. Chandra S.S., Ganguli S.K., Gupta S.K., Das S., Vidya R. and Agarwal V.K., (1993) : Awareness about AIDS-A study among college students. Indian Journal of Preventive and Social Medicine. 24, 84-88.
27. Chaturvedi Sanjay, Gupta Pusha, Rajoura O.P., Kumar Praveen and Agarwal O.P.: Impact of a multi-method promotional package or awareness and knowledge about STD and AIDS among the trainees of and Industrial Training Institute in a resettlement colony of Delhi, India; Journal of communicable diseases ; Dec. 1999; 31 : 209 - 212
28. Chin J. (1990a) : Global estimates of AIDS cares and HIV infections : 1990, AIDS, 4 (Suppl. 1), S277 - S283.
29. Chitale Vineeta, Das S. and Nadkarni V., (1992) : A study of the knowledge, attitudes, beliefs and practices on AIDS in 4 locals in Maharashtra-A report. Tata Institute of Social Sciences, Bombay: 117.
30. Christensen A., (2002) 'Truckers carry dangerous cargo'. Global Health Council, May1.
31. Chuttani C., (1990): Awareness and knowledge about AIDS among rural population in India. CARC Calling; 3: 220-222.
32. Cohen J.B., (1989) Condom Promotion among prostitutes. In condoms

- in the prevention of sexually transmitted diseases. Research Triangle Park, N.C. American Social Health Association. Monograph.
33. Cohen J.B. (1980), *Deviant Street Networks : Prostitution in New York City* Lexington, Mass : Lexington Books.
 34. Cohen J.B., Alexander P., and Wofsy C., (1988) *Prostitutes and AIDS : Public policy issues. AIDS and Public Policy*; 3 : 16-22.
 35. Cohen J.B., Poole L.B., Dorfman L.E., Lyons C.A., Kelly T.J., and Wofsy C.B., (1988a): changes in risk behaviour for HIV infection and transmission in a prospective study of 240 sexually active women in San Francisco. Presented at the fourth International Conferences on AIDS, Stockholm, June 12-16.
 36. Corbitt G., Bailey A.S. and Williams G., (1990) : HIV infection in Manchester. *The Lancet*: 1990: 336-351.
 37. Couland J.P., Lariven S.: (1995): AIDS and Adolescent (Epidemiology Prevention), *contracept. Fertil sex* 1995 Feb; 23 : 131 - 136.
 38. Dakar D.N. and Dakar S.N., (2001) 'Combating AIDS in the 21st century Issues and Challenges'. Sterling Publishers Private Limited, p.33.
 39. Darrow W. W., (1984) *Prostitution and sexually transmitted diseases*. In K.K. Holmes, P. Mardh, P.F. Sparling, and P.F. Wiesner, eds. *sexually transmitted diseases* New York : McGraw Hill.
 40. Darrow et al., in press (1989) : HIV seroprevalence in 1986-87 Among women who reported engaging in prostitution (at least once) since January 1978.
 41. Das A., Jana S., Chakraborty A.K., Khodakevich L., Chakraborty M.S., Pal N.K.: Community based survey of STD/HIV infection among commercial sex workers in Calcutta (India) : Part III - clinical findings of sexually transmitted diseases (STD). *The Journal of Communicable Diseases* ; Sept. 1995 ; 27 : 192 - 196.

42. De Cock, K.M., and Brun - Vezinet F. (1989) : Epidemiology of HIV - 2 infection AIDS, 3 (Suppl. 1) S89 - S95.
43. Dutta *et al.*, (2002) 'Strategizing peer pressure in enhancing after safer sex practices in brothel setting', Abstract TuPeF5332, The XIV International AIDS Conference.
44. Ekstrand M., *et al.*, (2003): 'HIV/AIDS in India', AIDS Policy Research Centre, University of California, August 2003, p.56.
45. European Study Group, (1992): European Study Group on Heterosexual Transmission of HIV - Comparison of female to male and male to female transmission of HIV in 563 stable couples. British Medical Journal: 304: 809-813.
- 45.1 Fauci.A.*et al.*, (1996): Annals int. Med. 124: 654.
46. Ferreira M.M., Ferrazoli L., Palaci M., Salles P.S., Medeiros L.A. and Novoa P., (1996) : Tuberculosis and HIV infection among female jail-inmates in Sao Paulo, Brazil : a prospective cohort study. J. Acquir. Immune. Defic. Syndr. Hum. Retroviral. 13: 177-183.
47. Fogarty J., (1990) : Knowledge About AIDS among learning certificate students. In. Med. J.: 1990 Mar; 83 : 19-21.
48. Francis P.T., Gill J.S., Chowdhury (1992) : Knowledge, Beliefs and Attitudes regarding AIDS, STD's and Human & Sexuality among senior secondary students in Delhi. HIV AIDS Research in India : 162-165.
49. Francis P.T., Gill J.S. and Chowdhary S., (1994) : knowledge, beliefs and attitudes regarding AIDS, STDs and human sexuality among senior secondary students in Delhi. Indian J.Comm. Med; 19: 16-20.
50. Froland S.S., Jenum P., Lindboe C.F., wefring K.W., Linnestad P.J. and Bohmer T.,(1998) : HIV-1 infection in Norwegian family before 1970. The lancet: I: 1344-1345.
51. Gellert G.A., Moore D.F., Max-well R.M., Mai K.K. and Higgins

- K.V., (1994) : Targeted HIV seroprevalence among Vietnamese in Southern California. *Genitourin. Med.* 70, 265-267.
52. Giri T.K., Wali J.P., Meena H.S., Pande I.R.A., Uppal S., Kailash S.: Sociodemographic characteristics of HIV infection in Northern India. *The Journal of communicable diseases* : March 1995; 27 : 1-3
53. Gomare *et al.*, (2002): 'Adopting strategic approach for reaching out to inaccessible population viz' Abstract WePeF6707F abstract. The XIV International AIDS Conference.
54. Goyal R.C., Kubermi A.T. and Somasundaran, (1994): AIDS awareness among rural community-A study. *Swasth Hind* 18, 266-272.
55. Greenberg,: "Immunopathogenesis of HIV infection". *Hospital practice*, vol. 27, No. 9, P. 154 © tortora func case. Reprinted with permission.
56. Gugnani A., and Ukeji M.K.S. : A study on existing knowledge about AIDS among undergraduates of a Nigerian University; *The Journal of Communicable Diseases* : June 1993 ; 25 : 52-54.
57. Gulati A.K. and Nath G.; HIV infection in Varanasi. *Journal of Communicable diseases*: June 1999; 31 : 117 – 119.
58. Heffernan G., (2004) 'Housewives account for one fifth of India's HIV cases, expert says'. *India Post and NCM*, April 16.
59. HIV/AIDS epidemiological Surveillance and Estimation report for the year 2005 <<http://www.nacoonline.org/>>, NACO, April 2006
60. Hokins C.A., Gendron S., Handley M.A. Richard C., Tung M.T.L. and O'shaughnessy M., (1994) : HIV infection among women in prison : an assessment of risk factor using a non-nominal methodology. *Am. J. Public Health*; 84: 1637-1640.
60. Horseburgh C.R. Jr., Jarvis J.Q., Mc-Arther T., Ignacio T. and Stock P., (1990): Seroconversion to human immunodeficiency virus in prison-inmates. *Am. J. Public Health*; 80: 209-210.

62. Hoth, Jr., Meyers, Stein, "current status of HIV Therapy," Hospital Practice, vol 27, No. 9, p.154. © tortora func case. Reprinted with permission.
63. Human Rights News (2002): 'AIDS in India: Money won't solve crisis, Rising violence against AIDS-affected people', November 13.
64. ICMR, (1994): AIDS and the family. Bulletin of Indian Council of Medical Research; 24: 115-130.
65. India backs low-priced HIV drugs' (2003). BBC News Online, December 1.
66. InfoChange (2003); 'HIV/AIDS in Manipur: the need to focus women', August.
67. Jain M., John T. and Keush G., (1994): A review of human immunodeficiency virus infection in India. J. AIDS; 7: 1185-1194.
68. Jana S., Chakraborty A.K., Das. A., Khoda Kevich. L., Chakraborty. M.S., Pal. N.K.: Community based survey of STD/HIV infection among commercial sex workers in Calcutta (India) : Part II sexual behaviour, knowledge and attitude towards STD. The Journal of Communicable Diseases : Sept. 1994; 26 : 168-172.
69. John T. Jacob (2002): Dr. T. JAcob John Pioneer and Prophet of HIV / AIDS work in India. CMJ1 2002; 17 : 34-35.
70. Joshi P.L. and Prasada Rao J.V.R., (1999) : Changing epidemiology of HIV/AIDS in India. AIDS Research and Review; 2: 7-9.
71. Kaiser Network (2003): 'India Must act to prevent tens of millions of HIV cases, UNAIDS director says: 458 M Indians already HIV-positive'. Daily HIV/AIDS Report, July 25.
72. Kallings L.O., (1992): The AIDS pandemic. CARC. Calling. 5(1): 7-11.
73. Kamat H.A. and Banker D.D., (1993) : HIV-1 infection among patients with sexually transmitted diseases in Bombay. Natl. Med. J. India:

6(1): 11-3.

74. Kaurdeen J., (1996): HIV risk behaviours among women in lower income inner city housing developments. *Amr J. of Public Health* : Aug 1996 Vol. 86 No. 8 : 1123 - 1127.
75. Kaur Harjeet, Marshalla Ruby : Seroepidemiology of HIV, HBV, HCV and Treponemal infections. *Journal of Communicable Diseases*: March 1998; 30 : 29-31.
76. Kuhn L., Steinber M. and Mathews C., (1994) : Participation of the school community in AIDS education-an evluation of a high school programme in South Africa. *AIDS Care*; 28: 20-27.
77. Kootikuppala S.R. *et al.*, (1999) 'Sexual lifestyle of long distance lorry drivers in India: a questionnaire survey'. *British Medical Journal*: January 16.
78. Khabbaz R.F., Darrow W.W., Hartley T.M., Witte J., Cohen J.B. *et al.*, (1990): Seroprevalence and risk factors for HTLV-I/II infection among female prostitutes in the united states. *Journal of the American Medical Association*: 263 : 60-64.
79. Kumar A., Mehra M., Singh S, Badhan S.K. and Gulati N., (1995) : Teacher's awareness and opinion about AIDS ; implication for school based AIDS education. *J. Commun. Dis.*; 27: 108-109.
80. Kumar. Avdhesh, Mehra. Malti., Singh S., Badhan, S.K., Gulati N.: Teacher's awareness and opinion about AIDS : Implication for school based AIDS Education. *The Journal of communicable Diseases* : June 1995; 27 : 32-35.
81. Kunte A., Misra V., Paranjape R., Mansukhani N., Padbidri V., Gonjaris., Kakrani V., Thakar M. and Mehendale S., (1999) : HIV seroprevalence and awareness about AIDS among pregnant women in rural areas of Pune district, Maharastra. India. *Indian J. Med. Res.*; 110: 115-122.

82. Lacerda R., gravato N., Mc Farland W., Rutherford G., Iskrant K., Stall R. and Hearst N. (1999) : Truck drivers in Brazil - prevalence of HIV and other sexually transmitted diseases, risk behaviour and potential for spread of infection. AIDS. 11 Suppl. L: S. 15-9.
83. Lal P., Kumar A., Ingle G.K. and Gulati N., (1994) : Knowledge and attitudes of university students regarding HIV/AIDS - an urban - rural difference. J. Commun. Dis.; 26: 186-191.
84. Lal Panna, Ingle, G.K., Gulati Neeha, (1999): AIDS - related apprehension among nursing students of Delhi. Journal of Communicable Diseases: Dec 1999 ; 39 : 217 - 219.
85. Lal Panna, Kumar Avdesh, Ingle G.K., Gulati Neena : Some Aids - related policy issues and Nursing student's willingness to provide AIDS Care. Journal of communicable diseases; March 1998 ; 30 : 38-40.
86. Lal S., Vashist B.M.S. Punia M.S. and Medical interns, (1999) : Evaluation of intensive information, education and communication campaign on HIV/AIDS in rural areas. Indian J. Comm. Med.; 24: 175-180.
87. Lalit M. and Nath, (1993) : HIV/AIDS update. Indian J. Comm. Med. 1, 26.
88. Lalvani A., Jayanthi S. and Shastri, (1996) : HIV epidemic in India : opportunity to learn from the past. The Lancet. 347: 1349-1350.
89. Lancaster J., (2003) 'AIDS begins to widen its reach in India: Disease spreading beyond high-risk groups to general population, Washington Post Foreign Service, June 11.
90. Lancaster J., (2003) 'AIDS Begins to Widen its reach in India', Washington Post, June 11.
91. Lawyers Collective HIV/AIDS Unit, (2002): 'Mandatory pre-marital testing', Newsletter 15, December.
92. Lisam D.R., (2002) 'Translating knowledge and experience into policy

- change and action-success stories from Manipur, India', Abstract TuPeG5514, The XIV International AIDS Conference.
93. Lonnec (1995): Epidemiology report from 12th World AIDS Conference.
 94. Mahendaly S.M., Shepard M.E., Divekar A.D., Gangakhedkar R.R. Kamble S.S. Menon P.A., Yadav R., Risbud A.R., Paranjpe R.S. Gadkari D.A., Quinn T.C., Bollinger R.C. and Rodrigues J.J., (1996) : Evidence for high prevalence and rapid transmission of HIV among individuals attending STD clinics in Pune, India. Indian J. Med. Res.; 104: 327-335.
 95. Mahendale S., (1998) : HIV infection amongst person with high risk behaviour in Pune city. AIDS Research and Review. 1, 2-9.
 96. Malavade J.A.B *et al.*, (2002): 'Ethical and legal issues in HIV/AIDS counseling and testing', Abstract ThPeE7902, the XIV International AIDS Conference.
 97. Malhotra V.L., and Lakshmy A.: HTLV - 1 in HIV seropositive Indian blood donors. The journal of communicable diseases : Dec. 1996; 28 : 270-273.
 98. Mathai R., Prasad P.V.S., Jacob M., George Babu P. and Jacob John T., (1990): HIV seropositivity among patients with sexually transmitted disease in Vellore. Indian J. Med. Res.; 91: 239-241.
 99. Mawar N., Mahendale S., Thilakwathi S., Shepherd M., Rodrigues J. Bollinger R., (1995); Awareness and Knowledge of AIDS and HIV risk among women attending clinic in Pune, India. Indian J., Med. Res. 1997 Sep; 106:212-212.
 100. Meda N., Sangare L., Lankoande S., Compaore I.P., Catraye J., Sanou P.T., Van Dyck E., Cartoux M. and Soudre R.B. (1998) : The HIV epidemic in Burkina Faso: current status and knowledge level of the population about AIDS, 1994-1995. Rev epidemiol Sante Publique, 46.

101. Mehra M. and Kumar A., (1994) : Gender differences on knowledge and belief regarding HIV/AIDS in an urban slum population of Delhi. HIV/AIDS Research in India, 132.
102. Mertens T.E. and Low Beed D., (1996) : HIV and AIDS : where is the epidemic going? Bulletin of WHO. 74, 12-19.
103. Mittal (1994) : KABP study in an urban slum of Delhi : HIV / AIDS Research in India, 214.
104. Mittal M., Garg S., Sehgal K. and Bansal R.D. (1995) : Women of an urban slum. Health issue in Delhi: 81-88.
105. Monk N., (2001) 'Orphans Alert 2 - Children of the HIV/AIDS Pandemic: The Challenge for India', Association Francois-Xavier Bagnoud.
106. Monthly update on AIDS <<http://www.nacoonline.org/facts.htm>>, NACO, 31 August 2004.
107. Monthly updates on AIDS <<http://www.nacoonline.org/facts.htm>>, NACO, 31 July 2005
108. Mukhopadhyay B.B., Biswal A.B. and Mukherjee B., (1996) : Knowledge and attitude about AIDS among newly admitted college students in Burdwan municipal area. HIV/AIDS Research in India. 216-222.
109. NACO 'National AIDS Control Programme Phase 1 (1992-1999)', www.naco.nic.in/nacp/phase1.htm accessed 21/8/03
110. NACO, (1999) : Specialist training and reference module. Epidemiology of HIV/AIDS. 1-11.
111. NACO, (2000) : Towards an AIDS Free India. Times of India, 1 December 2000. 11.
112. NACO 'National AIDS Prevention and Control Policy: 5.6: HIV testing', www.naco.nic.in/nacp/ctrlpol.htm, accessed 22/10/03

113. NACO 'Voluntary testing and counselling center guidelines',
www.naco.nic.in/nacp/ <<http://www.naco.nic.in/nacp/>>
[program/prog9.htm](http://www.naco.nic.in/nacp/program/prog9.htm) accessed 22/10/03
114. Nahimas A.J., (1986) : Evidence fro human infection with HTLV
 III/LAV like virus in central Africa, 1959. The lancet. i. 1279-1280.
115. Narayan R., Deepak M., Bhargava R., Agarwal U.S. and Saxena N.,
 (1994) : HIV Seroprevalence in various high risk groups at Jaipur. Ind.
 J. Dermatol Venercol Leprol. 60: 262-5.
116. National Intelligence Council (2002): 'The Next wave of HIV/AIDS:
 Nigeria, Ethiopia, Russia, India and China', September, p.3
117. Neogi D.K., Paul S., Bhattacharya N., Chakraborty T., and Mukherjee
 K.K. : HIV Screening of foreign nationals - An important observation
 pertaining to unauthorised travellers. Journal of communicable diseases
 : September 1997 ; 29 : 287-289.
118. NFHS. (1996) : National Family Health Survey 1992-1993, in "In the
 Dark" Nexus, Feb. - March. 4.
119. Norr K.F., Thou S.D., Me Elmurry B.J., (1996): AIDS awareness and
 blood handling practices of Health Care Workers in Lagos, Nigeria;
 Eur. J. Epidemiol: 1995 Aug; 11: 425-430.
120. Okojiie O.H., Ogbeide O., Nwelia A. (1995) : Knowledge, attitude and
 practice towards AIDS among civil servants in Nigeria. J.R. Soc.
 Health 1995 Feb.; 115 : 19-20.
121. Panda S. *et al.*, (2000) 'Transmission of HIV from injecting drug users
 to their wives in India'. International Journal of STD and AIDS: July:
 11 (7): 468-473.
122. Panda *et al.*, (2001) 'Interface between drug use and sex work in
 Manipur'. National Med J India, Jul-Aug; 14 (4): 209-11
123. Pandit K., Aggarwal O.P., (1994) : Awareness, Knowledge and
 attitudes towards AIDS amongst the spouses of paramedics living in a

- medical college cum hospital complex. HIV AIDS Awareness in India : 151 : 153.
124. Pal B.B., Acharya A.S. and satyanarayana K., (1999) : Seroprevalence of HIV infection among jail-inmates in Orissa. Ind. J.Med. Res.: 109: 199-201.
 125. Pal N.K., Chakraborty M.S., Das A., Khodo Kevich L., Jana S. and Chakraborty A.K.; community based survey of STD/HIV infection among commercial sex workers in Calcutta (India) : Part IV-Sexually transmitted diseases and related risk factors. The Journal of communicable diseases : Sept 1995; 27 : 197 - 202.
 126. Pavri K.M., (1994) : The origin of AIDS : How did HIV evolve? CARC Calling 7: 2; 2-10.
 127. Pedhambkar R.B., Pedhambkar B.S. and Kura M.M. (2001) : Study of risk factors associated with HIV seropositiviti in STD patients at Mumbai, India, Sexually Transmitted infections. 77, 388-389.
 128. Poddar A.K., Poddar Saha D., Mandal R.N. (1996) : Perception about AIDS among residents of a calcutta slum. Indian J. of Public Health : Vol xxxx No. 1 Jan - Mar 1996.
 129. Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat (2003) 'World population Prospects: the 2002 revision', Highlights, New York, February, p. 78-90
 130. Population reference Bureau (2003) '2003 Data Sheet Highlights: Using Global Population Projections', Data Sheet.
 131. Poster S.B., (1993) : Public Knowledge and attitude about AIDS among in calcutta, India. AIDS Care; Vol. 5; 2. 1993 : 110 - 115.
 132. Ramachandran P., (1992) : Women's Vulnerability Seminar. 396, 21-25.
 133. Rao a, Nag M., Mishra K. and Dey A., (1994) : Suxual behaviour patterns of truck drivers and their helpers in relation to female sex

- workers. The Indian Journal of Social Work. LV, 603-615.
134. Rathore A.S., (1997) : Prevalence of HIV infection in patient with STDs. Indian J. Comm. Med.; 22: 122-124.
 135. Ray K., Sachdeva K.G., Jaiswal N.L., Tewarik V.K. and Mishra R., (1995) : HIV seropositivity in a STD Centre in a cosmopolitan city in Northern India. Genito urinary Med. 71 (1), 58-59.
 136. Reid G. and Costigan G., (2002) 'Revisiting 'the Hidden Epidemic': a situation assessment of drug use in Asia in the context of HIV/AIDS', The Centre for Harm reduction, The Burnet Institute, Australia, January, p.81.
 137. Robert C., (1992) : Prevalence of anti-bodies to HTLV-I, -II and - III in intravenous drug abusers from an AIDS - endemic region. JAMA, 255, 3133-7.
 138. Rotily M., Galinier Pujoi A., Obadia Y., Moatti J.P., Toubiana P. and Vernay - Vaisse C., (1994) : HIV testing, HIV infection and associated risk factors among inmates in south-eastern French prisons. AIDS. 8, 1341-1344.
 139. Rosenblum M., (2003) 'Worldwide war on AIDS/HIV still coming up way short'. Associated Press, September 21.
 140. Roy Krishna, Mahajan Manju., Mishra R.S.: Sero Surveillance of HIV infection in high risk groups and in suspected AIDS cases in a New Delhi hospital. Journal of communicable Diseases : Sep 1997 ; 29 : 275 - 277.
 141. Sachdev P., (1998) : AIDS/HIV and university students in Delhi, Indian knowledge, beliefs, attitudes and behaviours. Social Work Health Care 1998; 26 : 37-57.
 142. Saini R., Bharti R., Sharma A.K. and Sharma D., (1992) : Evaluation of AIDS awareness amongst OPD patients of Civil Hospital, Amritsar. HIV/AIDS Research in India. 195.

143. Sehgal P.N., (1992) : Knowledge, attitude, beliefs and practices (KABP) study related to AIDS in Manipur state and intervention. HIV/AIDS Research in India: 137-140.
144. Sehgal P.N., (1993) : Knowledge, attitude, beliefs and practices (KABP) study related to AIDS in Tamilnadu state, India, an intervention strategy. HIV AIDS Research in India, 141-147.
145. Shankaran S.S., (2002) 'Intervention for women and children in the red light area'. Abstract WePeG6910. The XIV International AIDS Conference.
146. Simon F, *et al.*, sensitivity of seveening kits for the detection of anti-HIV-I Subtype O antibodies. AIDS 1994; 8 : 1628 - 1629.
147. Singh G.B., Dhaliwal D.S. Sekhan A.S., Kaur K., Singh S., and Karu P., (1999) : Seroprevalence of HIV among truck drivers. Indian. J. Comm. Med.; 24: 153-156.
148. Sivaram S., (2002) 'Integrating income generation and AIDS prevention efforts: lessons from working with devadasi women in rural Karnataka, India', Abstract MoOrF1048. The XIV International AIDS Conference
149. Smith P.F. Miki J., Truman B.I. Lessner L., Lehman J.S. and Stevens R.W., (1991) : HIV infection among women entering the New York State correctional system. Am. J. Public Health: 81 (Suppl.): 35-40.
150. Solomon S., Anuradha S., Ganapathy M. and Jagadewari, (1994) : Sentinel surevelillance of HIV-1 infection in Tamilnadu, India. Int. J. STD AIDS 5, 445-446.
151. Solomon S. and Ganesh A.K. (2002) 'HIV in India', International AIDS Society- USA, Vol. 10 Issue 3, July/August.
152. Srivastava V.K., Nirupam S. and Chandra R., (1992) : AIDS Awareness amongst school teachers. CARC Calling. 5: 22-23.
153. State Wise HIV Prevalence (1998-2003) <<http://www.nacoonline.org/>

facts.htm>, NACO, 2004.

154. Sundar M., Maurai Mary Laiha, J. Kavitha, C. Manjunath (1998- Knowledge of AIDS among student population in Bangalore city. HIV AIDS Research in India 1998) : 236 - 238.
155. Sunder M., Ravikumar K.K. and Sudarshan M.K., (1995) : A cross sectional seroprevalence survey for HIV-1 and high risk sexual behavior of seropositives in a prison in India. Indian J. Public Health; 39: 116-118.
156. Suryawanshi Rohini M, Deo Shantanu : Walking up to Reality. CMJ1 ; 17 : 25-27.
157. Thergaonkar W.P., Tripathy G.C., Agarwal S.K., Nagaraja T. and Sharma D., (1991) : A study on existing knowledge about AIDS among naval personnel. Journal of Communicable Diseases. 23, 191-194.
158. Tikoo Minakshi, Bollman R Stephan, Bergan Betsy M. (1995) : Knowledge level of youth in India regarding human sexuality and AIDS. J. of Sex and marital therapy 1995; 21 : 254 - 297.
- 159 The Lancet (2003): 'Spreading the word about HIV/AIDS in India', Vol.361, May 3.
160. U. Choudhury (2003): 'UN warns India is sitting on AIDS bomb as 4,58 million already infected', Agence France Press, July 28.
161. UNAIDS, WHO, (1998) : Report on the global HIV/AIDS epidemic, Geneva.
162. UNAIDS (2000) 'Report on the global HIV/AIDS epidemic 2000'. July p.13
163. UNAIDS : India : HIV and AIDS / related discrimination, stigmatization and denial, 2001.
164. UNAIDS (2001) 'Population Mobility and AIDS', Technical Update, February, p.5
165. UNAIDS : Report on the Global HIV/AIDS Epidemic, 2002.

166. UNAIDS/WHO: epidemiological fact sheets on HIV/AIDS and Sexually Transmitted Infections, 2004 Update, India <<http://www.who.int/GlobalAtlas/PDFFactory/HIV/index.asp?strSelectedCountry=IN>>.
167. UNAIDS/WHO (2005): Report on the global HIV/AIDS epidemic, geneva.
168. UNAIDS/WHO 2006: Report on the global AIDS epidemic .
169. UNPAN (2003): National AIDS Prevention and Control Policy (India).
170. USAID : Leading the Fight Against HIV/AIDS Thursday, 20 - sep, 2001 6 : 45 : 56 EDT.
171. USAID (2003): 'HIV/AIDS Country Profile India', March.
173. Vander Ryst E., Joubert G., Steyn F., Heunis C., Le hour J. and Williamson C., (2001) : HIV/AIDS related knowledge attitude and practices among South African military recruits. S. Afr. Med. J. 538.
174. Vasundhara M.K., (1993) : AIDS related knowledge and attitudes of medical students and in service doctors. CARC Calling, Vol. 6, No. 1, Jan - Mar, 1993 : 38
175. Vaz R.G., Gloyd S., Folgosa E. and Kreiss, (1955) : Syphilis and HIV infection among prisoners in Maputo, Mazambique. Int. J. STD AIDS. 6, 42-46.
176. Velhal G.D., Daniel E.E. and Pai N.P., (1994) : What do they know about AIDS? College students of Bombay. CARC Calling. 7, 36-40.
177. Verma Shashi (1988) : A rapid survey of assess AIDS awareness among college students in Bombay and Pune ; CARC Calling (1988).
178. Weekly Epidemiological Records, (1994), 16 Sept., (37), 273-275.
179. Weekly Epidemiological record : WHO 4 July 1997, Vol. 72, No. 27.
180. WHO (1992) : AIDS in Africa - A Manual for physicians. World Health Organization, Geneva, 4-20.
181. WHO. (1994) : AIDS - Images of the Epidemic, World Health

Organization, Geneva. 3-13.

182. WHO. (1999) : Joint United National Programme on HIV/AIDS and World Health Organization (WHO). AIDS Epidemic Update, December 1999.
183. WHO. (2000) : AIDS - men Make A Difference - Message from the Regional Deirector WHO SEA Region, WHO AIDS Day, 1 December 2000 (Unpublished Monograph).
184. Williams G., Stretton T.B. and Leonard J.C., (1983) : AIDS in 1959? The Lancet. ii. 1136.
185. World Bank Reports : 2001 India HIV / AIDS updates and Indian's National AIDS Control Program, September 1999.
186. World bank (2002) 'Number of AIDS orphans to rise', Press review, July 11.
187. World Bank 'South Asia Region (SAR)- India' Regional Updates.
188. Yohan Shobha : HIV / AIDS in India : CMJI ; 17 : 36-38.
189. YouandAIDS (2001): South and North East Asia at a glance: India.

APPENDIX - A (SUMMARY)

SUMMARY

Acquired Immuno-Deficiency Syndrome, is a fatal illness caused by retrovirus known as human immuno-deficiency virus, which breaks down the body's immune system leaving the victim vulnerable to a host of life threatening opportunistic infections, neurological disorders and unusual malignancies. Estimated number of HIV infections in the country have been reported to be 5.21 million (NACO, 2005). As sexual transmission is the most common mode of transmission of HIV/AIDS, high risk groups included in this study viz., truck drivers, S.T.D. patients, police personnel, P.A.C., personnel and Jail-inmates are more likely to indulge in unsafe sexual practices, due to the long stay outside their homes and families, thus being at higher risk of infection of HIV and low risk groups viz., students, teachers and paramedical staffs. For prevention of AIDS, it is necessary to know the extent of problem, knowledge of people on different aspects of AIDS and their attitudes towards AIDS patients and high risk practices which are responsible for transmission of HIV/AIDS. Keeping these factors in mind, this study was designed to fulfil the gap in knowledge on different aspects of HIV/AIDS in India. The specific objectives, of the study were :

- (i) To study the extent of problem of HIV/AIDS in the high risk population in Bundelkhand region in Uttar Pradesh.
- (ii) To explore the route of transmission in them.
- (iii) To study prevalence of HIV/AIDS in each of 5 high risk groups separately and also in three low risk groups.
- (iv) To study the socio-economic and demographic correlates of HIV/AIDS.
- (v) To asses their knowledge, attitude and practices regarding HIV/AIDS.

- (vi) To remove the misconception regarding AIDS transmission *viz* casual contact, shaving razors, sneezing/coughing and mosquito bite etc.
- (vii) To bring forth recommendations for use by health administrators and policy makers, to control the malady and prevent HIV in this region from its further spread.

The study units for the purpose of this study were truck drivers, police and P.A.C. personnel and jail-inmates. CSWs amongst high risk groups and students, teachers and paramedical staff amongst low risk groups. Total number of study subjects were 1613, in which 238 were CSWs, 502 were truck drivers, 202 were police personnel, 166 were P.A.C. personnel 1205 were jail-inmates. 100 students, 100 teachers and 100 para medical staff. Required data were collected on a predesigned questionnaire by direct personal interviews method. The survey was carried-out from may 2001 to october 2004. During the survey, firstly the written consent was taken from each individual after detailing them about aim and procedure of the study. After completion of interview, 5 ml blood was taken by using disposable needles and syringes. Every attempt was made to ensure the confidentiality of blood samples results. All the coded serum samples were subjected to HIV EI-A (Labsystems), a solid, phase enzyme immuno-assay for the detection of antibodies to HIV-1 and HIV-2 in human serum or plasma. Those samples who were positive for HIV, subjected to different ELISA, using different antigen preparation. Further those samples were again tested *via* one of the rapid methods (Tridot, capillus or comb's method).

- Results revealed, overall prevalence of 2.51% amongst HRG. Prevalence was high amongst commercial sex workers (4.20%) truck drivers (4.18%) followed by jail-inmates (0.98%). There was no any positive case among police and P.A.C. personnel. Adults (18-25 years) were affected more than

respondents of other age groups. Positivity was higher amongst unmarried and just literate persons. Hindus were more affected in comparison to other religion persons. Positivity was higher in SC/ST and in respondents from lower socio-economic status. Prevalence rate of HIV was higher amongst those who never used condom and it was again higher in those participants who had sex with partners other than their spouse and amongst unmarried who had sex relations. Positivity increased as number of sexual partners increased. Increasing positivity was seen in those who had sexual relations with relatives and commercial sex workers. Prevalence rate was again higher amongst those who were practicing oral and anal sex. Positivity was slightly higher among those who had undergone blood transfusion. Prevalence rate for HIV/AIDS was reported to be zero in case of low risk group 68.24%.

- In high risk groups, majority of respondents (68.24%) were aware that HIV/AIDS occurred in India. Television was the main source of knowledge on HIV/AIDS (63.44%), followed by family members and relatives (15.46%).

In low risk groups, also majority of respondents (93%) were aware that HIV/AIDS occurred in India. Television was the main source of knowledge on HIV/AIDS (42%), followed by books and magazines (38%).

- In high risk groups, more than half of the (52.09%) study subjects were aware that AIDS could be prevented by using different safety measures. About 50% respondents correctly reported that condom could be used for prevention of AIDS. Only 15.61% respondents incorrectly reported that there was vaccine available for prevention of it and 27.11% study subjects were having wrong information that it could be cured.
- In low risk groups, overall 93% study subjects were aware that AIDS could

be prevented by using different safety measures. About 89% respondents correctly reported that condom could be used for prevention of AIDS. Only 14.33% respondents in correctly reported that there was vaccine available for prevention of it and 4% study subjects were having wrong information that it could be cured.

- In high risk groups, sexual route of HIV transmission was known to 73.27% respondents while 48.21% and 50.19% respondents respectively heard about blood and infected needles as routes of HIV spread.

In low risk groups, sexual route of HIV transmission was known to 83% respondents while 81% respondents heard about blood and infected needles as routes of HIV spread vertical transmission was known to about 68.33%.

- In high risk groups, about 49.50% respondents knew that AIDS was major public health problem now a days. Further, correct answer was made by 86.63% police personnel followed by 83.13% P.A.C. personnel.

In low risk groups, about 92.33% respondents knew that AIDS was major public health problem now a days. Further, correct answer was made by 100% teachers and paramedical staff and 77% students.

- In these high risk groups, 54.91% respondents felt that investigation of HIV should be necessary prior to marriage, where as respondents who felt that testing for HIV should be done before admission in hospital (50.96%) or for every foreign tourist (53.40%) were nearly equal.

In low risk groups, 79.33% respondents felt that investigation of HIV should be necessary prior to marriage, where as respondents who felt that testing for HIV should be done before admission in hospital (50.96%) or for every foreign tourist (53.40%) were nearly equal.

In low risk groups, 79.33% respondents felt that investigation of HIV

should be necessary felt that testing for HIV should be done before admission in hospital was 80% on for every foreign tourist was 83.33%.

- In high risk group, nearly half (49.58%) of respondents favored introduction of sex education in schools curricula. Maximum percentage of respondents who were in favour of such education was in police and P.A.C.

In low risk groups, about 68.33% of respondents favoured introduction of sex education in schools curricula. Maximum percentage of respondents who were in favour of such education were in students (76%).

- In high risk group, percentage of respondents who were in favour of separation of AIDS patient from family was less (36.71%) than those who were against such separation (46%).

In low risk groups, only 12% respondents were in favour of separation of AIDS patient from family while majority of the respondents 81.33% were against it.

- In high risk groups, 33.82% respondents were of opinion that they should touch and care of AIDS patients, and 64.58% respondents were of view that AIDS patient could work in factory or office.

In low risk groups, 83% were of opinion that they should touch and care of AIDS patients, and 76% respondents were of view that AIDS patient could work in factory or office.

- In high risk groups, on the matter of sex with stranger, 56.66% respondents reported that they should avoid it, while on the matter of divorce of spouse who had AIDS, 37.24% study subjects were in favour and 40.52% were against it.

In low risk group, on the matter of sex with stranger, 89.33% respondents reported that they should avoid it, while on the matter of divorce of spouse

who had AIDS, only 9.67% study subjects were in favour and 74% were against it.

- In high risk group, about one-fourth (26.88%) respondents wrongly mentioned that they would suggest a woman with AIDS for marriage and child bearing, while majority of respondents were against it (43.72%).

In low risk groups, about 17% respondents wrongly mentioned that they suggest a woman with AIDS for marriage and child bearing, while majority of respondents were against it (75.67%).

- In high risk group, more than half 58.42% of participants felt that a person with infection of HIV should feel ashamed, while 26.96% participants were against of such opinion and 14.62% were indifferent on this matter.

In low risk group, only 10.33% respondents felt that a person with infection of HIV should feel ashamed, while 78.33% participants were against of such opinion and 11.34% were indifferent on this matter.

- In high risk group, about 44.93% respondents had their first sexual contact between 15 to 19 years and 32.44% had it between 20-24 years while 6.02% never experienced it.

In low risk groups, about 9% respondents had their first sexual contact between 15 to 19 years and 23.67% had it between 20-24 years while 35.44% never experienced it.

- In high risk groups, only 35.40% respondents reported having sex with partners other than their spouse, that is with friends, commercial sex workers, relatives and others.

In low risk groups, only 8.95% respondents reported having sex with partners other than their spouse, that is with friends, commercial sex workers, relatives and others.

- In high risk groups, practices of oral and anal sex were reported by 9.44%

and 16.15% respondents respectively. Such practices were higher among CSWs, truck drivers and jail inmates.

In low risk groups, practices of oral and anal sex were reported by 3.67% and 3% respondents respectively. Such practices were exclusively reported among paramedical staff.

- In high risk groups, respondents who never used condom (54.05%) were nearly equal to those who used it sometimes (42.14%), while only 3.81% respondents reported that they always used condom during sex.

In low risk groups, respondents who never used condom were about 20.73% only while 36.27% respondents used it sometimes and 43% respondents used it always.

Above mentioned findings of this study thus, make it clear that television, friends and newspaper were the main source of knowledge about AIDS. Most of the respondents had their first sexual contact before 19 years of age. Awareness about curability, preventability and transmission of AIDS was low. Attitude of respondent towards AIDS patients, however was encourgable. Sex education was approved by more than half of the respondents.

In high risk groups overall prevalence was high, while it was comparatively higher amongst CSWs and truck drivers. Positivity was higher in adults, unmarried illiterate and in respondents from low socio-economic status. No seropositivity for HIV/AIDS was found in low risk groups.

Incorporation of sex education in the curriculum of school, development of good literature on AIDS, preparation of more television programmes on AIDS and training of health personnel, teachers, personnel from NGOs were some of the actions, which were recommended by the respondents to make a positive change in peoples attitude and behavior regarding AIDS. Also, well planned

Information, Education * Communications activities will provide a definite thrust in this direction.

- In HRG, Majority of respondents (68.24%) were aware that HIV/AIDS occurred in India. Television was the main source of knowledge on HIV/AIDS (63.44%), followed by family members and relatives (15.46%).
- Amongst HRG, More than half of the (52.09%) study subjects were aware that AIDS could be prevented by using different safety measures. About 50% respondents correctly reported that condom could be used for prevention of AIDS. Only 15.61% respondents incorrectly reported that there vaccine was available for prevention of it and 27.11% study subjects were having wrong information that it can be cured.
- In HRG, Sexual route of HIV transmission was known to 73.27% respondents while 48.21% and 50.19% respondents respectively heard about blood and infected needles as routes of HIV spread.
- In HRG, About 49.50% respondents knew that AIDS was major public health problem now a days. Further, correct answer was made by 86.63% police personnel followed by 83.13% P.A.C. personnel.

In HRG, In these high risk groups, 54.91% respondents felt that investigation of HIV would be necessary prior to marriage, whereas respondents who felt that testing for HIV should be done before admission in hospital (50.96%) or for every foreign tourist (53.40%) were nearly equal.

- In HRG, Nearly half 49.58% of respondents favored introduction of sex education in schools curricula. Maximum percentage of respondents who were in favour of such education were in police and P.A.C.
- In HRG, Percentage of respondents who were in favour of separation of AIDS patient from family was less (36.71%) than those who were against

such separation (46.00%).

In HRG, Only 33.82% respondents were of opinion that they should touch and care of AIDS patients, and 64.58% respondents were of view that AIDS patient could work in factory or office.

- In HRG, On the matter of sex with stranger, 56.66% respondents reported that they should avoid it, while on the matter of divorce of spouse who had AIDS 37.24% study subjects were in favour and 40.52% were against it.
- In HRG, About one-fourth (26.88%) respondents wrongly mentioned that they would suggest a woman with AIDS for marriage and child bearing, while majority of respondents were against it (43.72%).
- In HRG, More than half (58.42%) of participants felt that a person with infection of HIV should feel ashamed, while (26.96%) participants were against of such opinion and (14.62%) were indifferent on this matter.
- In HRG, About 44.93% respondents had their first sexual contact between 15 to 19 years and 32.44% had it between 20-24 years while 6.02% never experienced it.
- In HRG, Only 35.40% respondents reported having sex with partners other than their spouse, that is with friends, commercial sex workers, relatives and others.
- In HRG, Practices of oral and anal sex were reported by 9.44% and 16.15% respondents respectively. Such practices were higher among CSWs, truckdrivers and jail-inmates.
- In HRG, Respondents who never used condom (54.05%) were nearly equal to those who used it sometimes (42.14%), while only 3.81% respondents reported that they always used condom during sex.

Above mentioned findings of this study thus, make it clear that television,

friends and newspaper were the main source of knowledge about AIDS. Most of the respondents had their first sexual contact before 19 years of age. Awareness about curability, preventability and transmission of AIDS was low. Attitude of respondent towards AIDS patients, however, was encourgable. Sex education was approved by more than half of the respondent in high risk groups. Overall prevalence was high while it was comparatively higher amongst CSWs and truch drivers positivity was higher in adults, unmarried illiterate and in respondents from low social-economic status. No seropositivity for HIV/AIDS was found in low risk groups.

Further, in this study in was found that the immune system of HIV positive person was mainly affected. In HIV positive respondents mainly the CD_4^+ count of the blood was decreasing day by day. Patient became weak and was prone to various secondary infections. Rich diet, proper medicines, proper care and attention were recommended by the HIV positive respondents.

Incorporation of sex education in the curriculum of school, development of good literature on AIDS, preparation of more television programmer on AIDS and training of health personnel, teachers, personnel from NGOs were some of the actions, which were recommended by the respondents to make a positive change in peoples attitude and behavior regarding AIDS. Also, well planned Information, Education & Communications activities would provide a definite thrust in this direction.

APPENDIX - B
(QUESTIONNAIRE
OR
WORKING PROFORMA)

SEROPREVALENCE OF HIV INFECTION AND STUDY OF IMMUNE SYSTEM IN HIGH RISK AND LOW RISK GROUP OF U.P. REGION.

Study Unit-

Name	:	
Age	:	
Sex	:	Male/Female
Marital Status	:	
Married/Unmarried/Divorcee/Widow/Widower/Separated		
	:	
Religion	:	Hindu/Muslim/Sikh/Christian/Others
Caste	:	General/OBC/SC/ST
Family background	:	Urban/Rural/Slum
Literacy status	:	Illiterate/Literate/Junior high School/High School/Intermediate/ Graduate and above
Occupation individual	:	Unemployed/Business/Service/Labour/Agriculture/House hold work/Student/ Other (Specify)
Number of persons in family	:	Monthly family income: (all source)
Per capita monthly	:	Social class: I.II.III.IV.V.
Family income	:	
Personal history	:	
Symptoms of AIDS	:	Smoking/Alcohol/Drug intake (IV/oral)
Presenting sign	:	

Section I : Knowledge on HIV/AIDS

1. Do you know about AIDS ? Yes/No
2. Does AIDS occur in India ? Yes/No/ Do not know
3. What is the main source of your knowledge about AIDS :
(i) Newspaper, (ii) Book/magazines, (iii) Television, (iv) Family members/ Friends
4. Is there any vaccine available for prevention of AIDS? Yes/No/ Do not know
5. Is AIDS curable ? Yes/No/ Do not know

- not know
- 6) Is AIDS preventable? : Yes/No Do not know
- 7) Can condom be used for prevention of AIDS ? : Yes/No/Do not know
- 8) Can AIDS be transmitted by a person who in looking healthy?: Yes/No/Do not know
- 9) AIDS can be transmitted by: i) Casual contact ii) Sharing utensils iii) Sneezing/Coughing iv) Mosquito v) Sexual relationship with multiple partners vi) Use of an infected needle vii) Blood transfusion viii) Mother to her child in the womb
- 10) Do you know about STD?: Yes/No

Section II : Opinion on HIV/AIDS

- 1) Is AIDS a public health problem?: Yes/No/Do not know
- 2) Should investigation of HIV/AIDS be compulsory before marriage?: Yes/No/Do not know
- 3) Should every patient admitted in hospital be investigated for HIV?: Yes/No/Do not know
- 4) Should every foreign tourist be investigated for HIV? Yes/No/Do not know
- 5) Should sex-education be a lesson for school children?: Yes/No/Do not know
- 6) Should AIDS patient be separated from family ? : Yes/No/Do not know
- 7) Should a person touch and care an AIDS patient ? : Yes/No/Do not know
- 8) Should a person avoid sex with the attractive stranger?: Yes/No/Do not know
- 9) Can AIDS patient work in a factory/office ? : Yes/No/Do not know
- 10) Should a person divorce his/her spouse who has AIDS ? : Yes/No/Do not know
- 11) Should a person feel ashamed if he/she has AIDS ? : Yes/No/Do not know
- 12) Would you suggest a woman with AIDS for marriage and child bearing ? : Yes/No/Do not know

Section III : source of infection of HIV/AIDS

- 1) At what age, you had your first sexual contract ? : Yes/No
- 2) Did you have sex with partners other than your spouse ? : one/more than one
- 3) If yes , no. of such sexual partners ? :
- 4) Who were your sexual partners ? : (i) Commercial sex workers (ii) Relatives (iii) Friends (iv) Neighbours (v) Call girls (vi) Beggars]
- 5) Have you done oral sex.?: Yes/No
- 6) Have your done anal sex ? : Yes/No
- 7) Do you know that your spouse has any other sexual partner ? : Yes/No/Do not know
- 8) If yes, number of such sexual partners : One/More than one/Do not know
- 9) Do you use condoms during sex ? : Always / Some times / Never
- 10) Did you ever need injectables ? : Yes/No
- 11) In case you had injectables, do you always insist on use of disposable needles and syringes :
Yes/No/ Not sure
- 12) Did you ever need blood transfusion ? : Yes/No/Not sure
- 13) If yes, then whether blood was from : Relatives/ Voluntary donors / Professional donors / Do not know
- 14) How many times you needed blood transfusion ? : One/Two/Many
- 15) Did you ever donate your blood ? : Yes/No
- 16) If yes then how many times ? One/Two/Many times
- 17) What was the reason of blood donation ? : Patient was relative/ To earn money/Other reason (Specify)-
- 18) Are you taking (or have taken) intoxicating drugs by injections ? : Yes/No/Not sure
- 19) If yes (i) Do you use fresh needles and syringes each time ? : Yes/No/Not sure
(ii) If common needles or syringes were shared within a group ? :

Section IV : Investigations

Blood sample code :
taken :

Date on which sample was

Result of the test :

(i) HIV : (i) Positive
(ii) Negative

(ii) AIDS : Yes
No

Dated :

Place : Jhansi (U.P.)

Signature of the
Investigator